COMPARISION BETWEEN ULTRASOUND GUIDED QUADRATUS LUMBORUM BLOCK AND TRANSVERSUS ABDOMINIS PLANE BLOCK FOR POST OPERATIVE PAIN MANAGEMENT IN LOWER ABDOMINAL SURGERIES

DISSERTATION SUBMITTED FOR THE DEGREE OF DOCTOR OF MEDICINE

BRANCH – X (ANAESTHESIOLOGY)

APRIL-2019

THE TAMILNADU

DR.M.G.R MEDICAL UNIVERSITY CHENNAI,

TAMILNADU

CERTIFICATE BY GUIDE

INSTITUTE OF ANAESTHESIOLOGY AND CRITICAL CARE

This is to certify that this dissertation titled **"COMPARISON BETWEEN ULTRASOUND GUIDED QUADRATUS LUMBORUM BLOCK AND TRANSVERSUS ABDOMINIS PLANE BLOCK FOR POST OPERATIVE PAIN MANAGEMENT IN LOWER ABDOMINAL SURGERIES"** is a bonafide and genuine research work done by **Dr.THANGJANGUL KHONGSAI** in partial fulfillment of the requirement for the degree of **MD in Anaesthesiology and Critical care**.

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INSTITUTE OF ANAESTHESIOLOGY AND CRITICAL CARE

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DECLARATION

I, **Dr.THANGJANGUL KHONGSAI** solemnly declare that, this dissertation titled "**COMPARISON BETWEEN ULTRASOUND GUIDED QUADRATUS LUMBORUM BLOCK AND TRANSVERSUS ABDOMINIS PLANE BLOCK FOR POST OPERATIVE PAIN MANAGEMENT IN LOWER ABDOMINAL SURGERIES"** has been done by me. I also declare that this bonafide work or a part of this work was not submitted by me or any other for any award, degree or diploma to any other University or board either in India or abroad.

This is submitted to The Tamilnadu DR.M.G.R Medical University, Chennai in partial fulfillment of the rules and regulations for the award of Doctor of Medicine degree branch X (Anaesthesiology) to be held in APRIL 2019.

Place: Madurai **Dr.THANGJANGUL KHONGSAI**

Date:

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Place: Madurai

Date:

Dr.THANGJANGUL KHONGSAI

TABLE OF CONTENTS

INTRODUCTION

The use of ultrasound guided nerve blocks have become an integral part of post operative pain management in modern day practice ,unless there is a contraindication for it.Ultrasound guided transversus abdominis plane(TAP) block has been commonly employed for pain relief in lower abdominal surgeries.Since transversus abdominis plane block is limited to somatic sensory blockade,the introduction of quadratus lumborum block(QLB) has provided a different approach not only in terms of technique,but also in covering both somatic as well as visceral pain.Quadratus lumborum block may provide analgesia over a longer period and larger number of dermatomes.This study focuses on further understanding these two different types of block. With the use of ultrasound, nerve plexus or muscle and fascial can be exactly located for delivery of drug.It also helps in visually guiding the block needle to target nerves or plane,thus prompting fewer attempts with higher success rate of block.Nerve localization by trial and error as done with anatomical landmark approach is avoided.The use of ultrasound also help in markedly reducing the volume of local anaesthetic drugs used and lower the risk of side effects.

CLINICAL ANATOMY

ANATOMY OF ANTERIOR ABDOMINAL WALL

The layers of the anterior abdominal wall consists of the following structures – a) Skin

b) Subcutaneous tissues

c) Fascia

1) Camper fascia – fatty superficial layer

2) Scarpa fascia – deep fibrous layer

d) Muscles

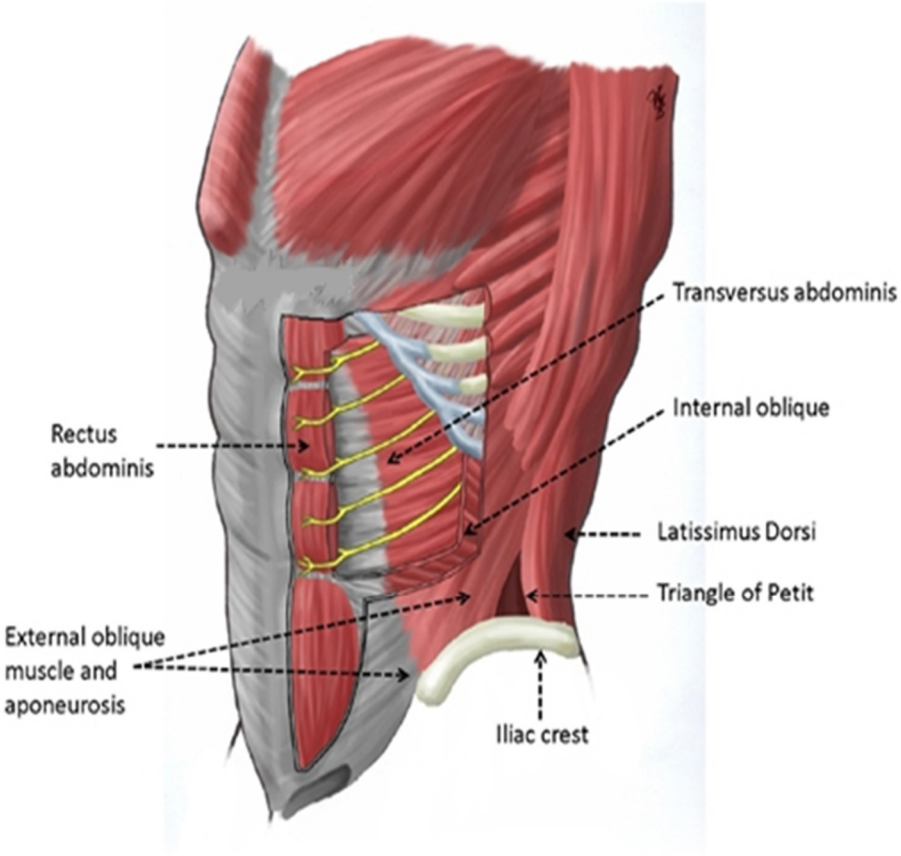
1) Ractus abdominis

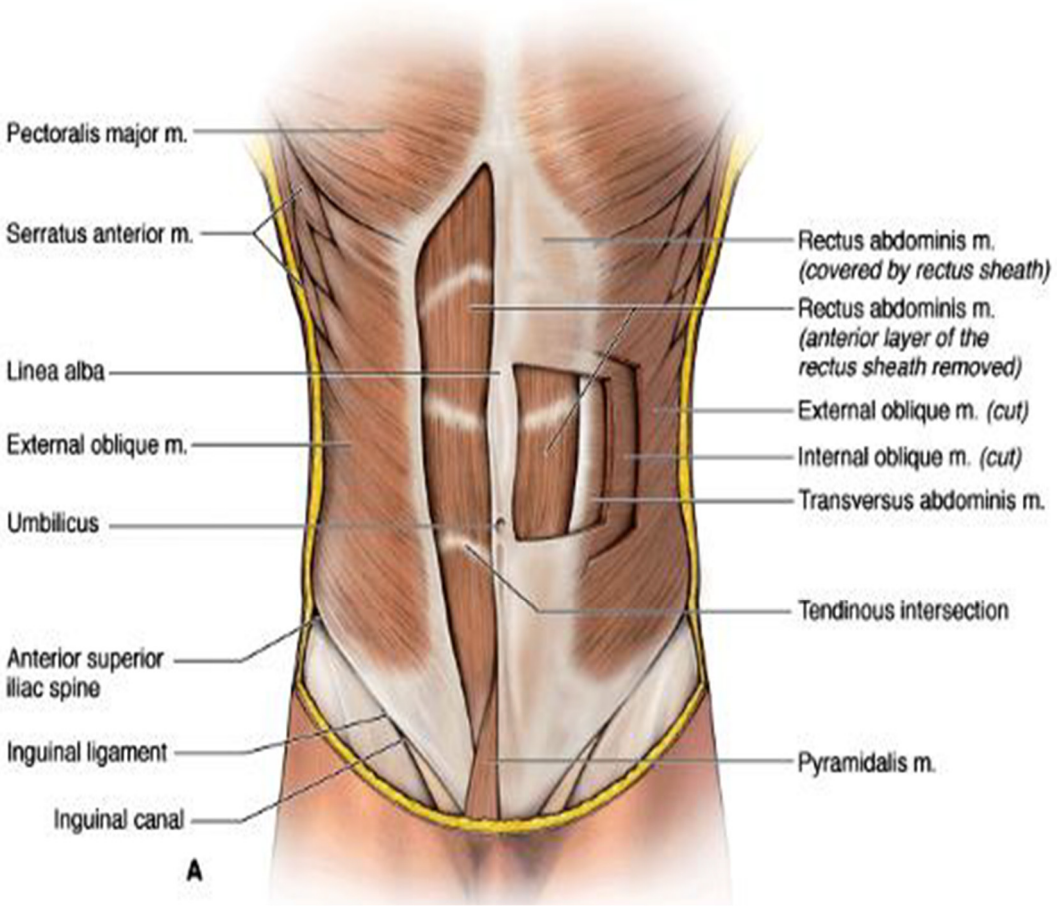
2) External oblique muscle

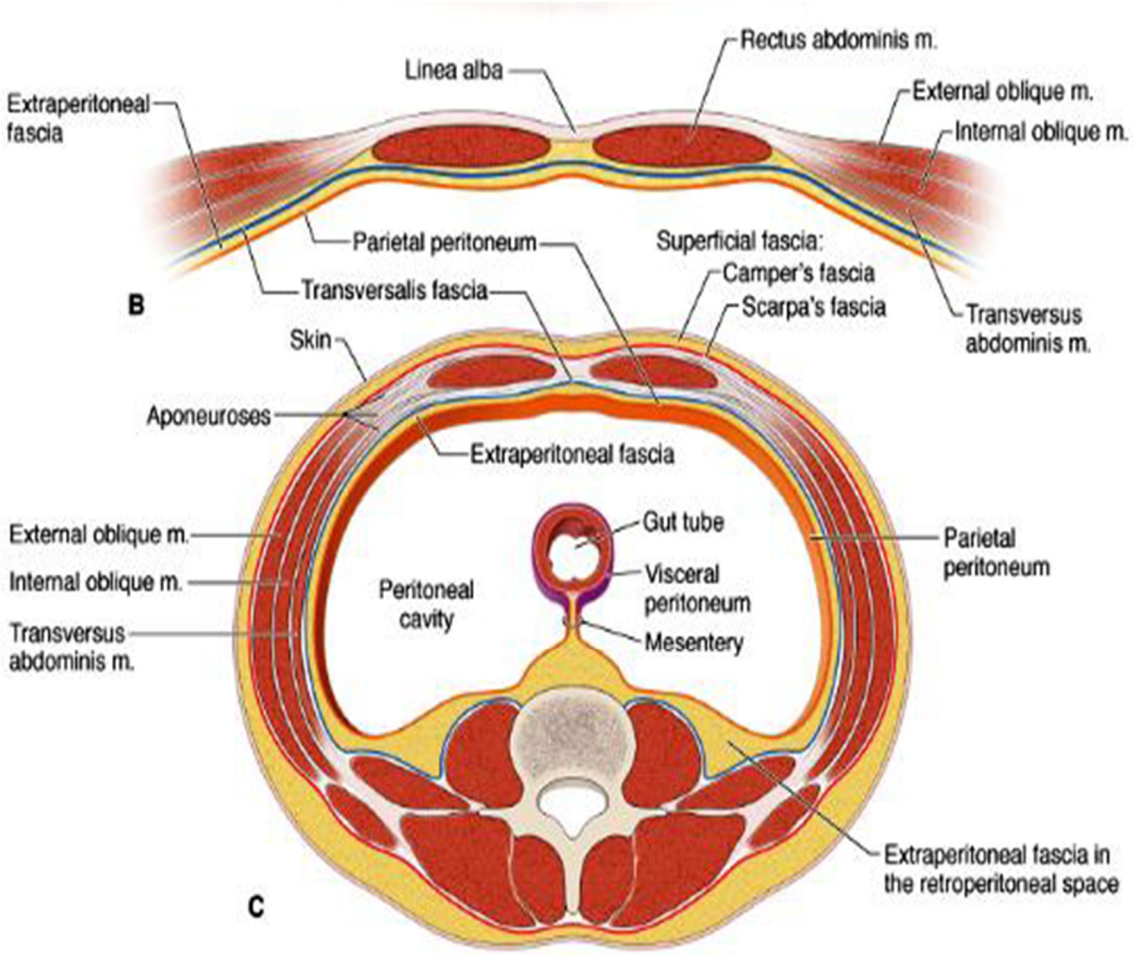
3) Internal oblique muscle

4) Transversus abdominis muscle.

5) Fascia transversalis


Transversus abdominis
Internal oblique
Rectus abdominis
Latissimus Dorsi
Triangle of Petit
External oblique muscle and aponeurosis
Iliac crest

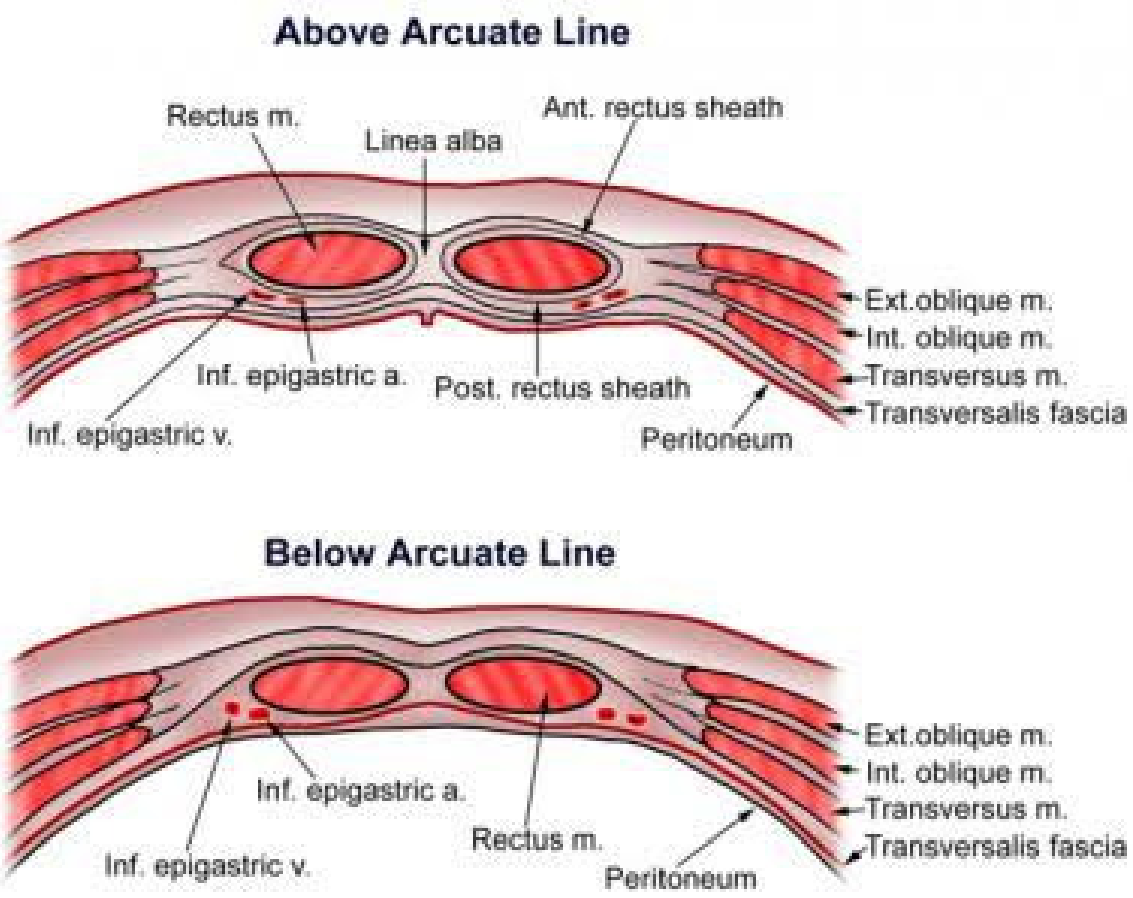

Pectoralis major m.
Serratus anterior m.
Linea alba
External oblique m.
Umbilicus
Anterior superior iliac spine
Inguinal ligament
Inguinal canal
A
Rectus abdominis m. (covered by rectus sheath)
Rectus abdominis m. (anterior layer of the rectus sheath removed)
External oblique m. (cut)
Internal oblique m. (cut)
Transversus abdominis m.
Tendinous intersection
Pyramidalis m.


Rectus abdominis m.
Linea alba
External oblique m.
Internal oblique m.
Extraperitoneal fascia
Parietal peritoneum
Superficial fascia:
Camper's fascia
Scarpa's fascia
Transversalis fascia
B
Transversus abdominis m.
Skin
Aponeuroses
Extraperitoneal fascia
External oblique m.
Internal oblique m.
Transversus abdominis m.
Gut tube
Visceral peritoneum
Mesentery
Peritoneal cavity
Parietal peritoneum
Extraperitoneal fascia in the retroperitoneal space
C

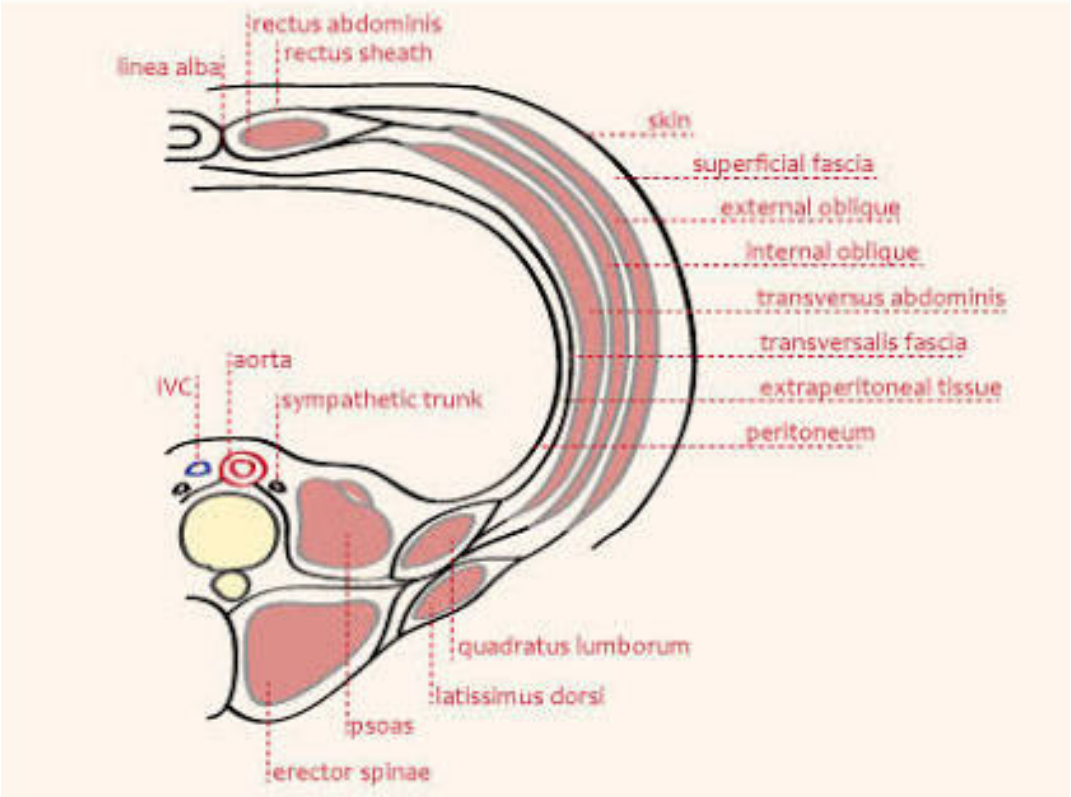
TRANSVERSUS ABDOMINIS PLANE

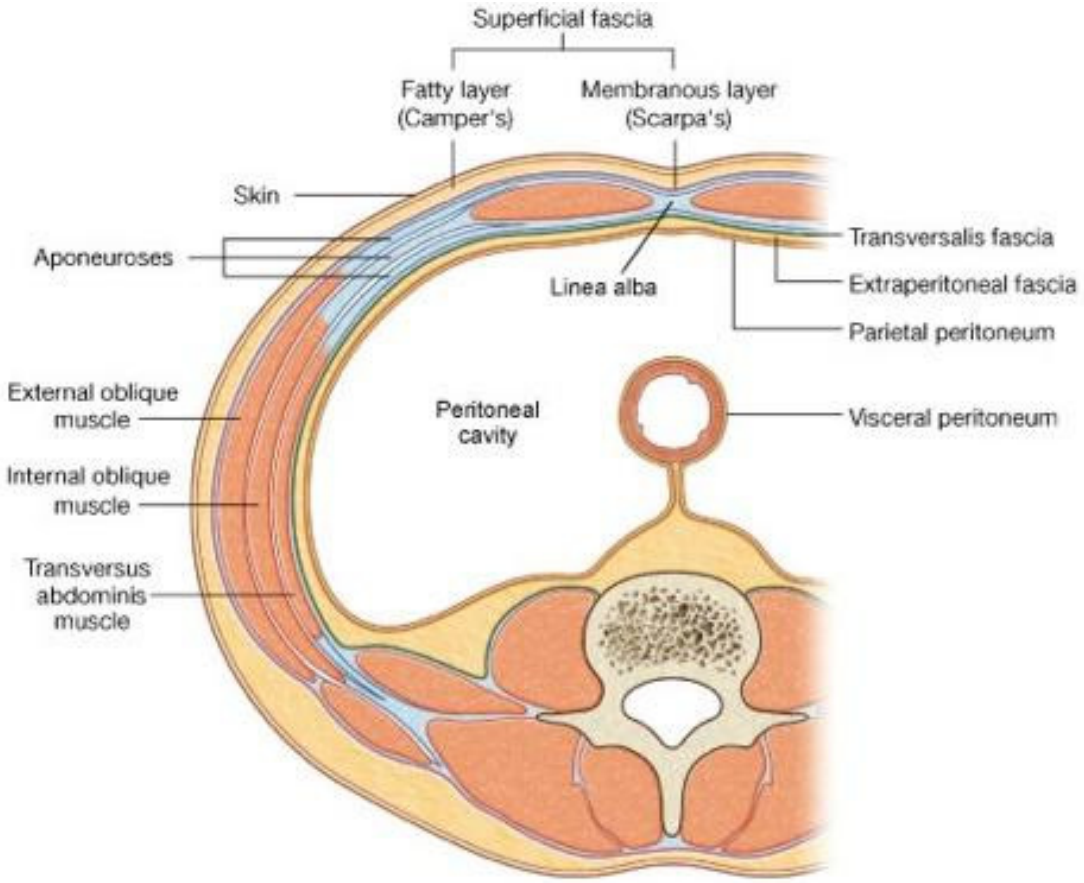
The transversus abdominis plane is a fascial plane that lies between the to the transversus abdominis muscle and the internal oblique muscle on the anterolateral aspect of the abdomen wall. The nerves lie deep to this fascial sheath.

The upper and anterior part of the transversus abdominis muscle lies posterior to the rectus abdominis muscle. The posterior aponeuroses of the transversus abdominis and internal oblique muscles fuse and attach to the thoracolumbar fascia (TLF).


Above Arcuate Line
Rectus m.
Linea alba
Ant. rectus sheath
Ext.oblique m.
Int. oblique m.
Transversus m.
Transversalis fascia
Inf. epigastric a.
Post. rectus sheath
Inf. epigastric v.
Peritoneum
Below Arcuate Line
Ext.oblique m.
Int. oblique m.
Transversus m.
Transversalis fascia
Inf. epigastric a.
Rectus m.
Inf. epigastric v.
Peritoneum

Anterior Abdominal Wall




Superficial fascia
Fatty layer (Camper's)
Membranous layer (Scarpa's)
Skin
Aponeuroses
Linea alba
Transversalis fascia
Extraperitoneal fascia
Parietal peritoneum
External oblique muscle
Peritoneal cavity
Visceral peritoneum
Internal oblique muscle
Transversus abdominis muscle

NERVE SUPPLY OF ANTERIOR ABDOMINAL WALL

TRANSVERSUS ABDOMINIS PLANE (TAP) PLEXUS

The extensive branching and communication of segmental nerves in the transversus abdominis plane,especially from T9-L1 form what is known as “TAP Plexus”.This plexus consists of the following nerves –

1**.The intercostal nerves from T6-T11 Thoracic spinal nerves**

These are part of the somatic nervous system which arise from the anterior rami of the thoracic spinal nerves.

Intercostal nerves extend from T1 to T11 distributed over the pleura and peritoneum .

T1 and T2 supply the upper limb along with the thorax.

T3 to T6 supply the wall of the thorax.

T7 to T11 supply both thoraxic and abdominal walls.

T6-T9 enter TAP medial to the anterior axillary line whereas T9-L1 run laterally.This may explain why TAP block in preferable only for lower abdominal surgeries.

2.The Subcostal Nerve

It is the 12th thoracic spinal nerve.

The anterior division of T12 gives a branch that communicates with the iliohypogastric nerve of the lumbar plexus.

It runs anteriorly to the quadratus lumborum muscle and innervates the transversus abdominis muscle.

3. Lumbar Spinal Nerve(L1*)*

This nerve arises from below the 1st lumbar vertebra .

It's terminal branches form the iliohypogastric,ilioinguinal and genitofemoral nerve ,which are part of the lumbar plexus.

L1 supplies to important muscles,namely quadratus lumborum(partly) and iliopsoas(partly).

Therefore, the TAP plexus in general innervate the anterolateral abdominal wall, including the parietal peritoneum. TAP blockade requires anesthesia of upper and lower TAP plexus.

The subcostal approach to the TAP block covers the intercostal nerves T6–T9 between the rectus abdominis sheath and the transversus abdominis muscle.

The lateral TAP block in the midaxillary line between the lower thoracic margin and iliac crest as well as between the internal oblique and transversus abdominis muscles reaches the intercostal nerves T10– T11 and the subcostal nerve T12.The L1 segmental nerves in the TAP are not covered by the lateral TAP block .It requires an anterior TAP block medial to the anterior superior iliac spine.Posterior approach to block the TAP plexuses can be performed through the triangle of Petit.TAP blocks provide somatic analgesia of the abdominal wall including the parietal peritoneum.

LUMBOSACRAL PLEXUS

It is formed by the anterior divisions of the first four lumbar nerves (L1-L4) with contribution from subcostal nerve (T12).It is enveloped within a sheath between the psoas major muscle and the quadratus lumborum muscle.

The anterior division of L1 form the ilioinguinal nerve and iliohypogastric nerve while it communicates with the anterior division of L2 to form the genitofemoral nerve.The L2,L3 and L4 roots divide into anterior and posterior divisions .

The anterior divisions of L2, L3 and L4 form the obturator nerve whereas the posterior divisios converge to form the femoral nerve and the lateral cutaneous nerve of thigh.

The following two nerves are involved in quadratus lumborum block –

1.Iliohypogastric Nerve

It is formed by T12-L1 spinal nerves.

It crosses the quadratus lumborum block and penetrates the transversus abdominis muscle,dividing into a lateral cutaneous branch which supplies the anterior gluteal region and a terminal branch whichn supplies the skin over pubic bone.

2.Ilioinguinal Nerve

It is formed by the anterior division of L1

It accompanies the iliohypogastric nerve in it's early course just inferior to the iliac crest before piercing the internal oblique and run medial to the external oblique aponeurosis

It supplies the upper and medial thigh and the adjoining skin of external genitalia.

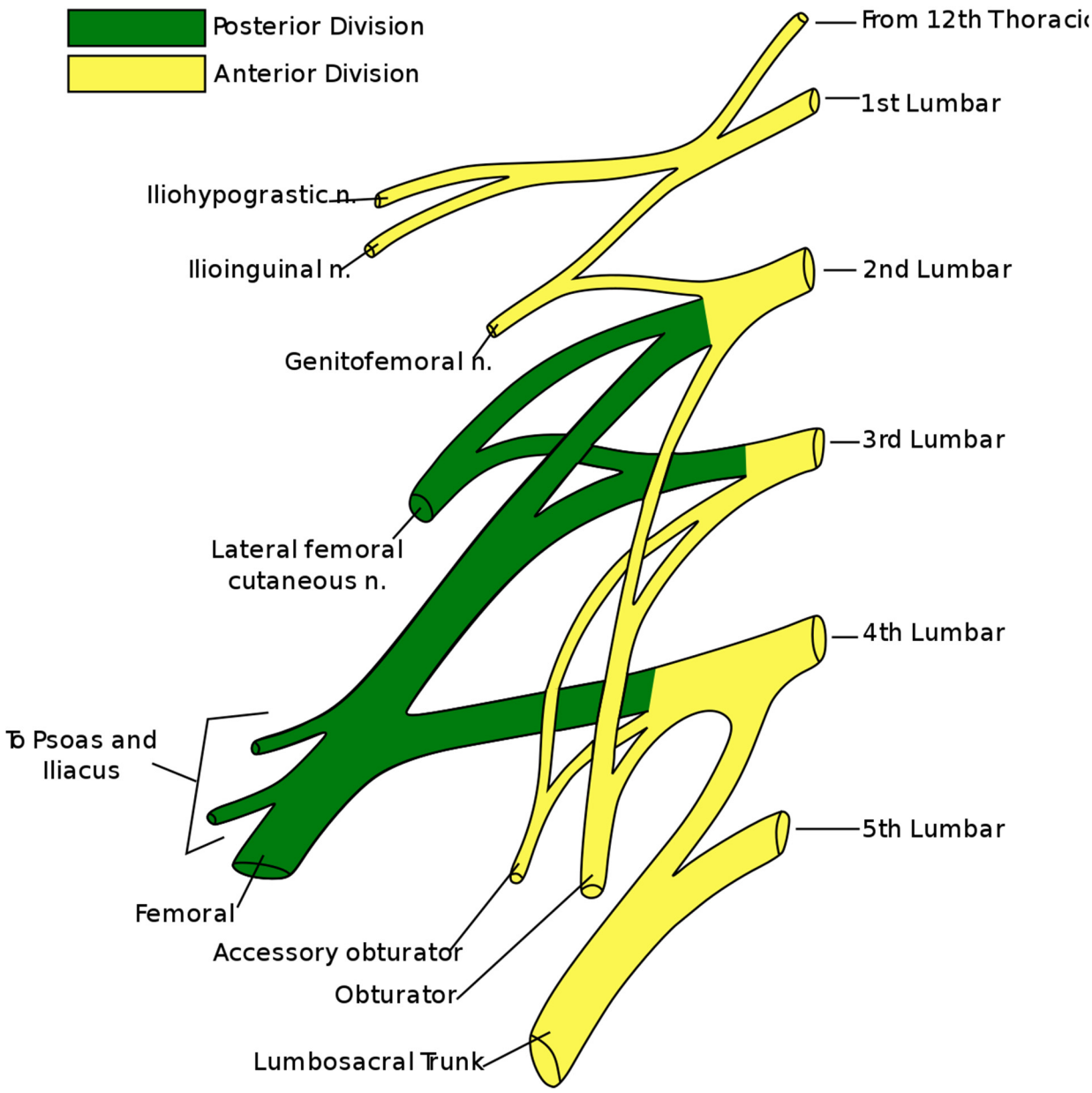


FIGURE . LUMBAR PLEXUS

QUADRATUS LUMBORUM MUSCLE

Quadratus lumborum posterior abdominal wall muscle usually referred to as back muscle.

Origin – Iliac crest of ilium

Insertion – Transverse process of L1-L4 vertebrae and the inferior border of 12^{th} rib

Nerve supply – Lumbar plexus (T12,L1-L4) and 12^{th} thoracic nerve(subcostal nerve)

Relations – Anterior – colon,psoas major kidney and diaphragm

- Dorsomedially – intrinsic muscles of back
- Iliohypogastric and ilioinguinal nerves run anterior to the muscle and continue towards the lateral abdominal wall.

Actions - It stabilizes the spine and pelvis

- Unilateral flexion of vertebral column
- Bilateral depression of the rib cage

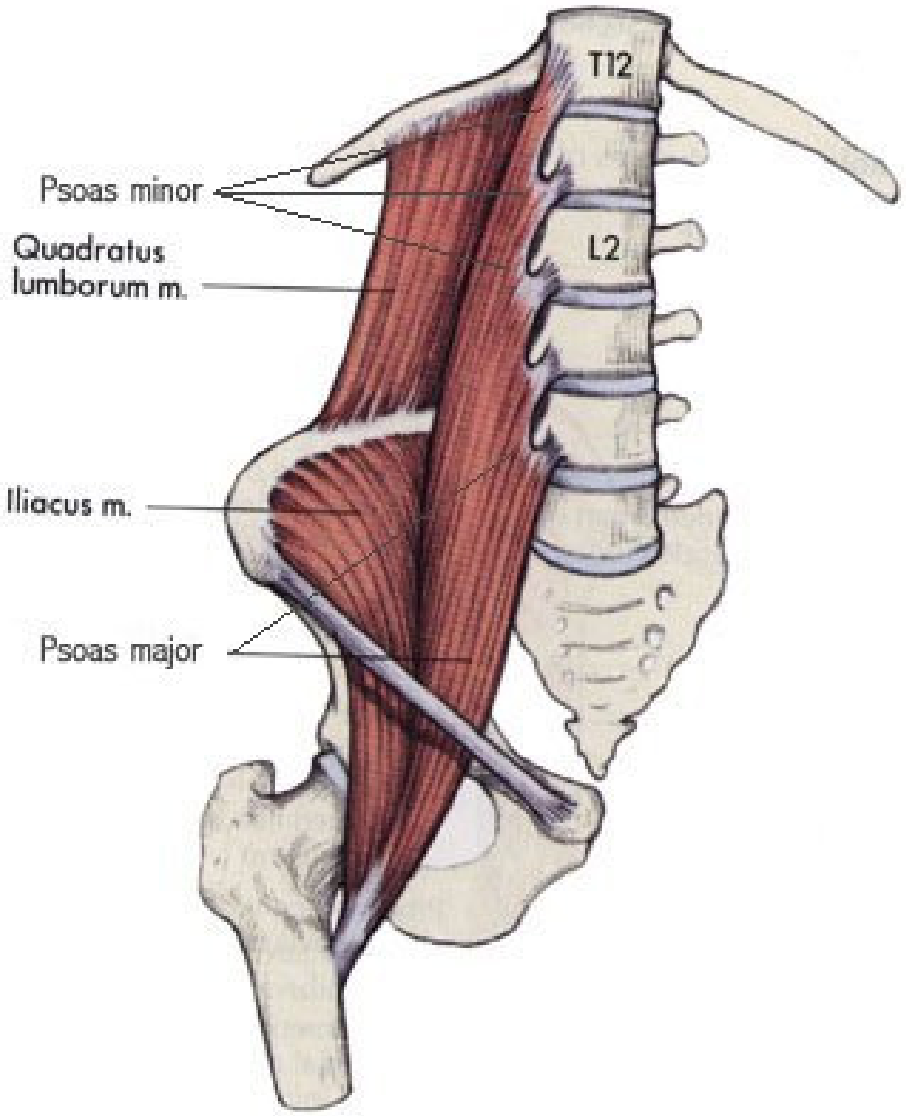


FIGURE. ORIGIN AND INSERTION OF QUADRATUS LUMBORUM MUSCLE

THORACOLUMBAR FASCIA

The thoracolumbar fascia is a fascial layer that covers the muscles of the back extending from the thoracic to the lumbar spine.It affects the spread of local anesthetic. The fascia consists of 3 layers-

1.Anterior layer

2.Middle layer

3.Posterior layer

The anterior layer is anterior to the quadratus lumborum muscle. The middle layer lies between the erector spinae and the quadratus lumborum muscle muscle. The posterior layer encases the erector spinae. The anterior layer also blends medially with the fascia of the psoas major and laterally with the transversalis fascia. Injection between the anterior layer and quadratus lumborum can spread cranially under the lateral arcuate ligament to the endothoracic fascia and reach the lower thoracic paravertebral space posterior to the endothoracic fascia. A triangular structure called the lumbar interfascial triangle (LIFT) is the target of injection for QL2 block(quadratus lumborum 2). The fascia besides serving as portal for spread of local anaesthetic to the thoracic paravertebral space also contains a dense network of sympathetic fibers as well as mechanoreceptors that majorly contribute to effects of quadratus lumborum block.

ULTRASONOGRAPHY

Ultrasound waves are sound waves with a frequency greater than 20,000Hz. These frequencies are above the audible upper limit of human hearing. Medical Ultrasound is the application of this ultrasound waves to visualise the internal organs of our human body. The frequencies used for this purpose is the range of 3 to 20 MHz.

Ultrasound Pulse Generation

The ultrasound transducer contains multiple piezoelectric crystals which are interconnected electronically. When mechanical energy is applied to these crystals and some ceramics, they generate electrical energy. This phenomenon known as the “Piezoelectric Effect” was first described by the Curie brothers in 1880. They also described the “Reverse Piezoelectric effect”, wherein application of electricity to these crystals produced vibrations which generate ultrasound waves.

Ultrasound Wavelength and Frequency

The wavelength and frequency are inversely related. High frequency ultrasound waves (10 to 20 MHz) give images with a high axial resolution but are more attenuated as we go deeper; therefore these transducers are optimal to image the superficial structures. Low frequency ultrasound waves

(2 to 8 MHz) penetrate deeper but provide low axial resolution and are used to image deeper structures.

Ultrasound Tissue Interaction:

As the ultrasound waves travel through tissues, they are partly transmitted to deeper structures, partly reflected back to the transducer as echoes, partly scattered, and partly transformed to heat.

Reflection

For image generation, the echoes returned after hitting a tissue interface is of interest to us. The amount of echo returned after hitting a tissue interface is determined by a tissue property called acoustic impedance. The intensity of a reflected echo is proportional to the mismatch in acoustic impedances between two mediums.

Refraction

The change in the direction of the ultrasound waves after hitting an interface between two media with different velocities of sound transmission is refraction. This causes artefacts as the returning echoes are incorrectly located.

Scattering

Ultrasound waves which incident on the tissues at right angles are reflected back to the transducer. If the waves are not at right angle, then the returning echoes are scattered in all directions in a non-uniform manner

Absorption

Some of the ultrasound waves are absorbed by the tissue and are converted to heat.

Attenuation

As the ultrasound waves travel through tissue, the returning echoes will become weaker due to absorption, scattering and refraction.

Diffraction

The spreading out of the ultrasound waves as its moves further away from the source is diffraction.

Image Construction:

The ultrasound probe has an array of individual transducers which acts as both a transmitter and a receiver. Each transducer emits a short burst of ultrasound and is quiescent until it detects the echoes returning. This is called “Pulsed Ultrasound”. The speed of ultrasound in our body tissues is

fairly constant at a speed of 1540m/s. The time taken for an echo to return is used determine the distance between the tissue and the probe.

Across the plane of an image, the ultrasound image is swept to form two-dimensional images one line at a time. These lines are then summated to produce a frame. The frames are repeated to produce a real-time image. The brightness of the image depends upon the amplitude of the returning echo from the anatomical interfaces.

Scanning Modes

A-mode (amplitude mode): This displays a single echo signal against time to measure depth.

B-mode (brightness mode): It is a two dimensional image produced using an array of transducers and a series of reflected echoes.

M-mode (motion mode): is a specialized type of B-mode imaging where one particular line is ensonified repeatedly to examine a moving structure plotting out how the structure moves with time.

ULTRASOUND CONTROLS

Gain alters the brightness of the image by amplifying the received signal.

Time-Gain Compensation (TGC) differentially amplifies signals from different depths, allowing equal amplitudes from all depths to be displayed.

Focus adjusts the beam to be at its narrowest at the required depth to image the region of interest. It thereby improves lateral resolution

Depth can be adjusted to have the structure that is being examined to be in the centre of the screen.

APPROACHES AND TECHNIQUES

There are two basic approaches to ultrasound guidance. With the out-of-plane technique, the needle tip crosses the plane of imaging as an echogenic dot. With the in-plane approach, the entire tip and shaft of the advancing needle are visible.

Out-of-plane:

Advantages:

1) Most similar to other approaches to regional block (nerve stimulation or palpation)

2) Shorter needle path than with in-plane approaches

3) Along the nerve path (catheters) Disadvantages:

1) Unimaged needle path, crossing the plane of imaging without recognition.

In-plane (IP):

Advantages: Most direct visualization.

Disadvantages:

1) Partial line-ups (creating a false sense of security when the needle tip is not correctly identified)

2) Some unimaged needle path occurs with IP approach, but typically less than with OOP approach.

3)Longer paths and therefore more structures to cross with the block needle.

TRANSVERSUS ABDOMINIS PLANE BLOCK (TAP BLOCK)

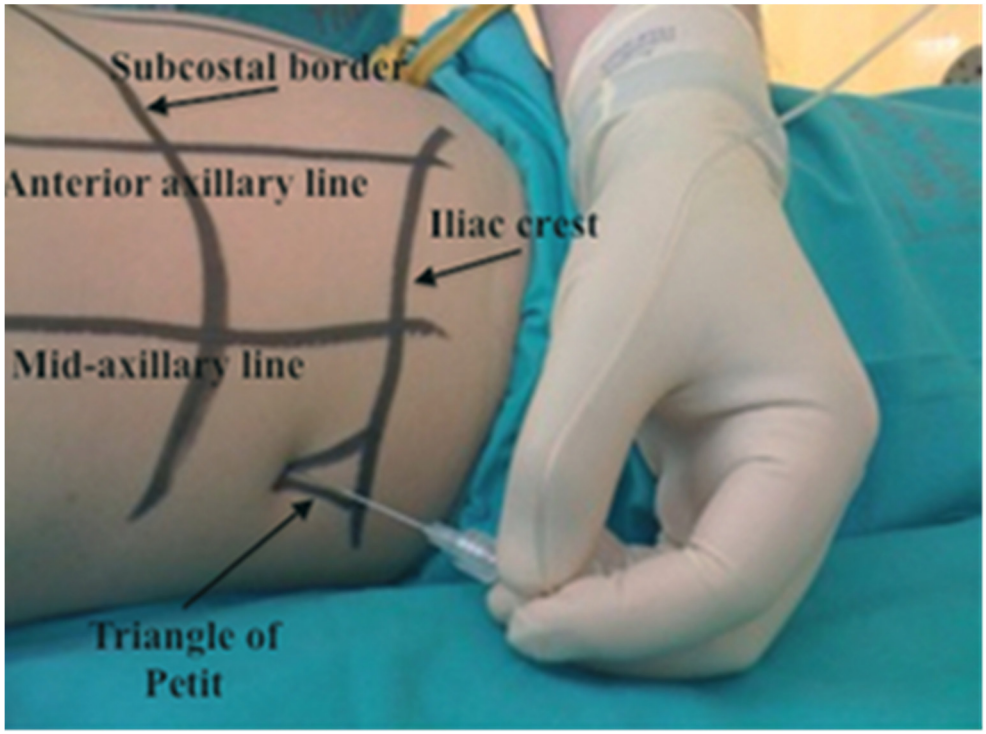
Kuppuvelumani, et al were the first to describe Transversus abdominis plane (TAP) block, in 1993 and formal documentation of TAP block was done in 2001 by Rafi.The TAP block is perhaps now one of the commonly performed abdominal wall block.

It can be performed either with -

1) Landmark based technique

2) Ultrasound guidance

LANDMARK BASED TECHNIQUE: (Blind technique):



In this approach, the lumbar triangle of Petit is identified. The triangle of Petit is formed by the iliac crest as the base, the external oblique muscle as the anterior border, and the latissimus dorsi muscle as the posterior border. [1] The floor of the triangle is made up of the fascia from both the external and internal oblique muscles. A needle is inserted perpendicular to the skin just cephalad to the iliac crest near the midaxillary line. The TAP is identified using a 2-pop sensation (loss of resistance). The first pop indicates penetration of the fascia of the external oblique muscle, and the second indicates penetration of the fascia of the internal oblique muscle. Local anesthetic is then injected with multiple aspirations.

ULTRASOUND GUIDED TECHNIQUE

There are two injection locations for this block

1) The subcostal TAP block for surgeries above the level of umbilicus

2) The posterior TAP block for surgeries below umbilicus .

This is based on cadaver studies which showed the spread of local anaesthetics.

Indications:

1) Large bowel resections

2) Open/lap cholecystectomies

3) Cesarean section

4) Renal transplants

5) Hernia repair

6) Open/lap appendicectomies

SONOGRAPIC ANATOMY

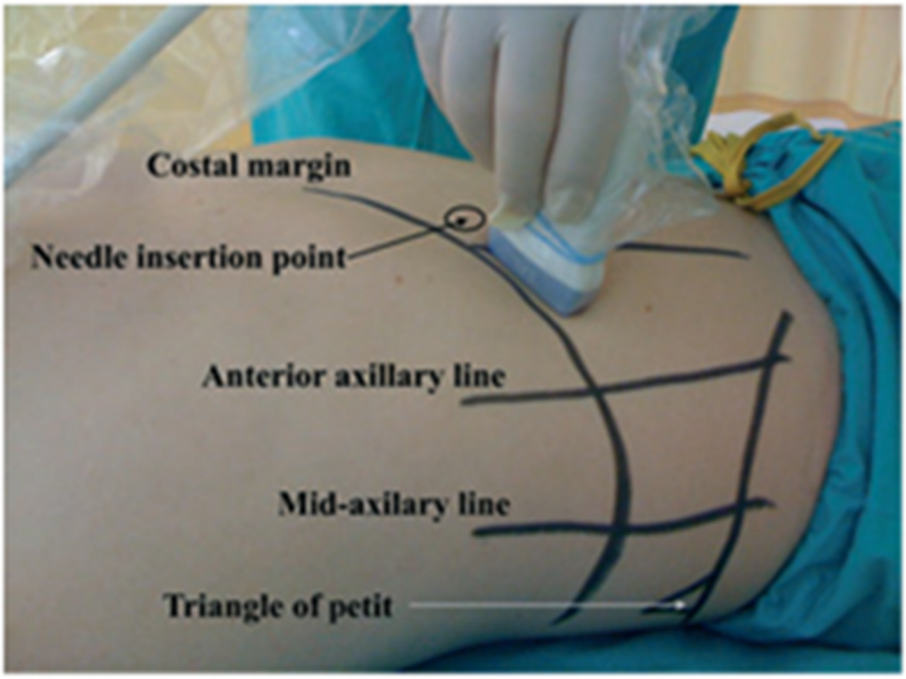
The first step in performing TAP blocks with ultrasound guidance is to identify the muscles of the anterolateral abdominal wall . The external oblique is usually the most echogenic muscle of the anterolateral abdominal wall. The external oblique and internal oblique muscles typically extend farther posteriorly than the transversus abdominis muscle. Retroperitoneal fat (hypoechoic appearance on ultrasound scans) lies under the posterior aspect of the transversus abdominis muscle. The layers underneath the transversus abdominis muscle are (in order) the transversalis fascia, extraperitoneal fat, and peritoneum.

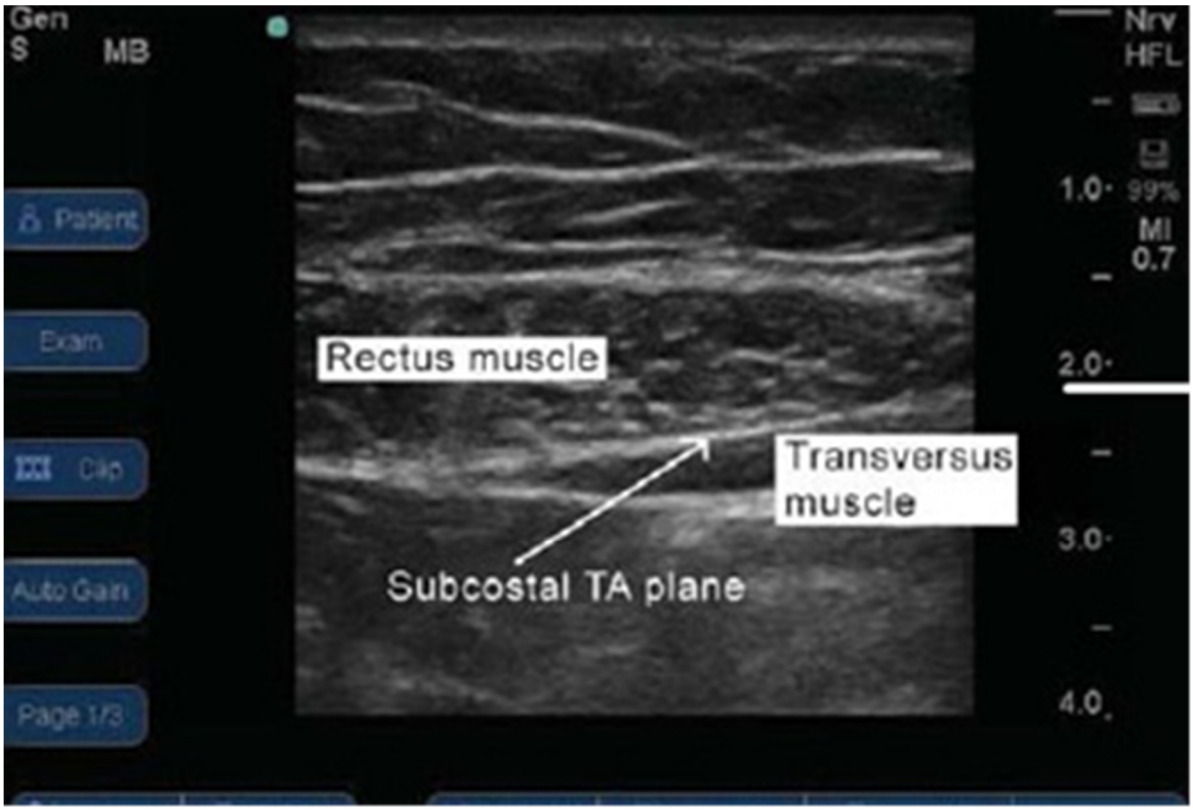
SUBCOSTAL TAP

The scan is started close to the xiphisternum and the probe is angled towards the costal margin. The rectus abdominis muscle is visualised in this area as a spectacle shaped structure with the linea alba. As the probe is moved laterally, the all three muscles of the anterior abdominal wall come

into view with the first being transversus abdominis visible beneath the rectus muscle.

It is favorable to inject the drug near the lateral border of the rectus muscle just above the transversus abdominis as this opens up the plane easily.

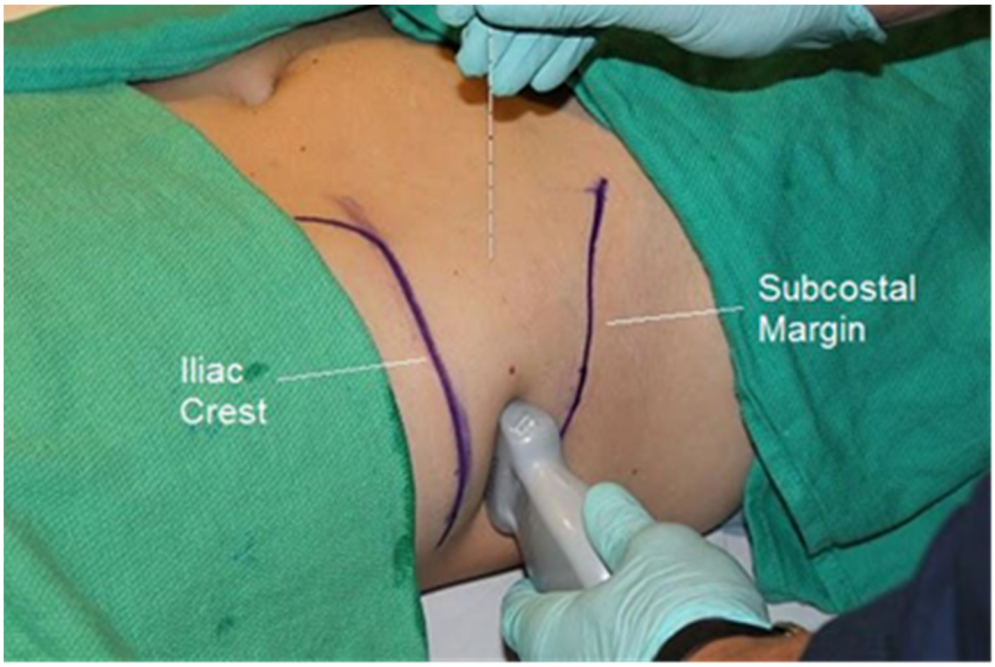


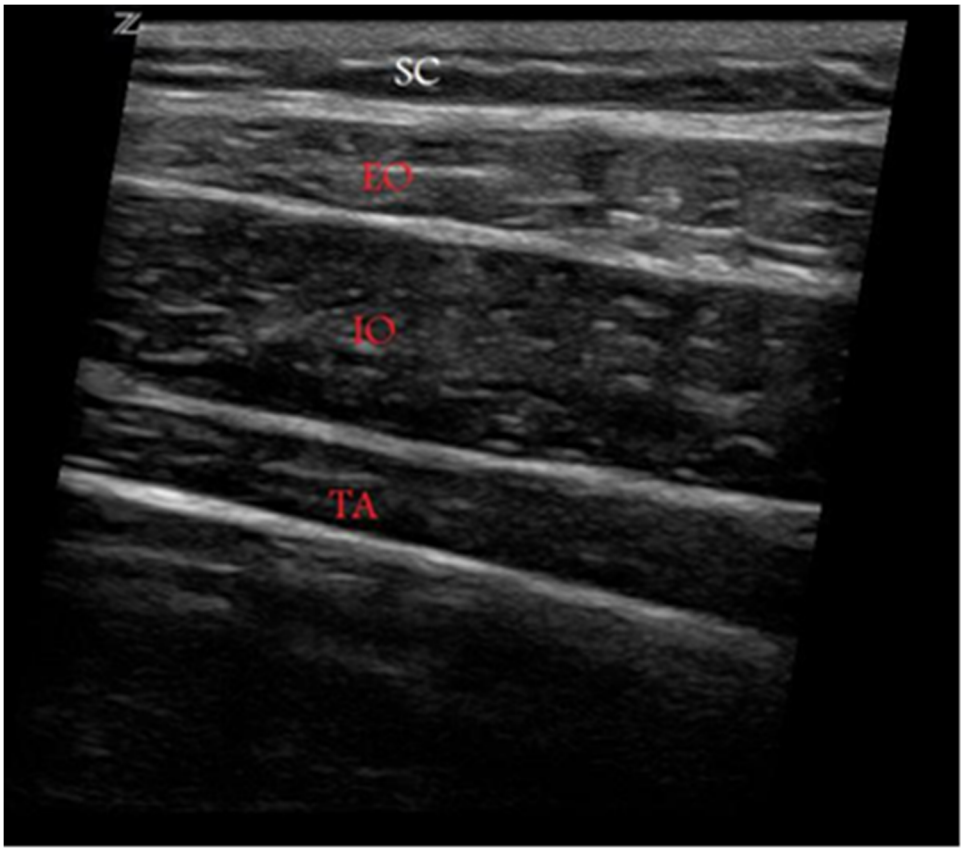

Gen
S
MB
Nrv
HFL
Patient
Exam
Calc
Auto Gain
Page 1/3
1.0
99%
MI
0.7
2.0
3.0
4.0
Rectus muscle
Transversus muscle
Subcostal TA plane

POSTERIOR TAP BLOCK

TAP blocks can be performed in supine or lateral position. Bilateral TAP blocks are usually performed in supine position with the operator and ultrasound machine in one location (block across the midline and on the same side). The lateral approach is the best way to provide access beyond the posterior border of the transversus abdominis muscle.

The lateral position is more intuitive for the operator and retracts soft tissue away from the transducer by gravity. This soft tissue retraction makes the block easier in obese patients. The transducer is placed between the costal margin and iliac crest in the midaxillary line at the level of the umbilicus. The drug is deposited in between the internal oblique and transversus abdominis muscles.


Subcostal
Margin
Iliac
Crest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QUADRATUS LUMBORUM BLOCK (QL BLOCK)

Quadratus lumborum block was first described by Blanco et al in 2007. It has ever since gained much popularity as a new approach for post-operative pain management in abdominal surgeries and even hip surgeries.

TECHNIQUE OF QUADRATUS LUMBORUM BLOCK

The quadratus lumborum block is purely an ultrasound guided block.QL block can provide sensory blockade from T4 to L1.

There are 3 types of QL block –

1.Type 1 QL block (lateral QL block)

2. Type 2 QL block (posterior QL block)

3. Transmascular block(Anterior QL block)

TECHNIQUES OF QUADRATUS LUMBORUM BLOCK

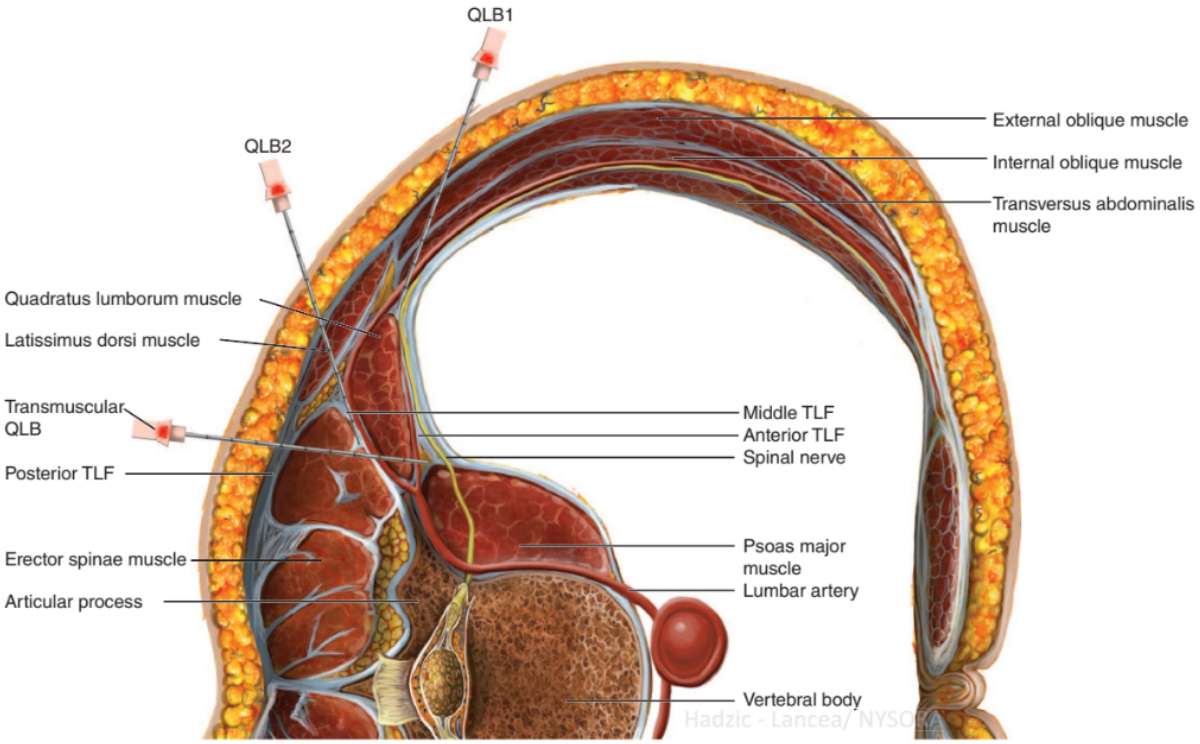
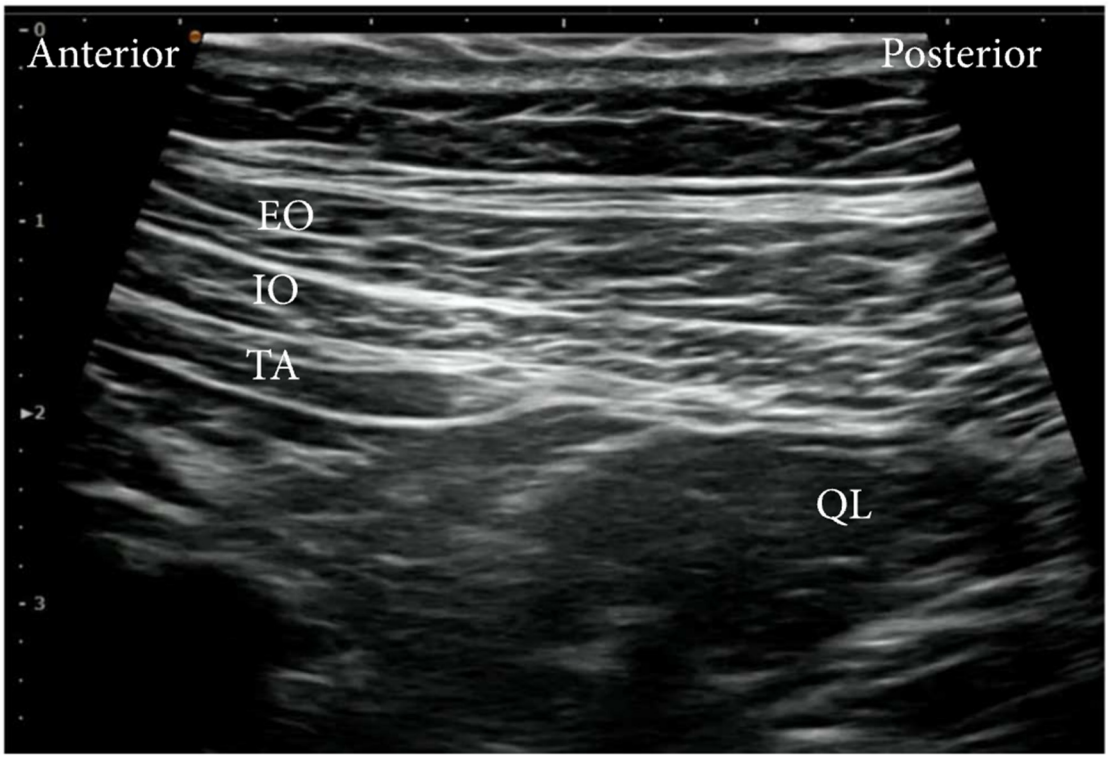


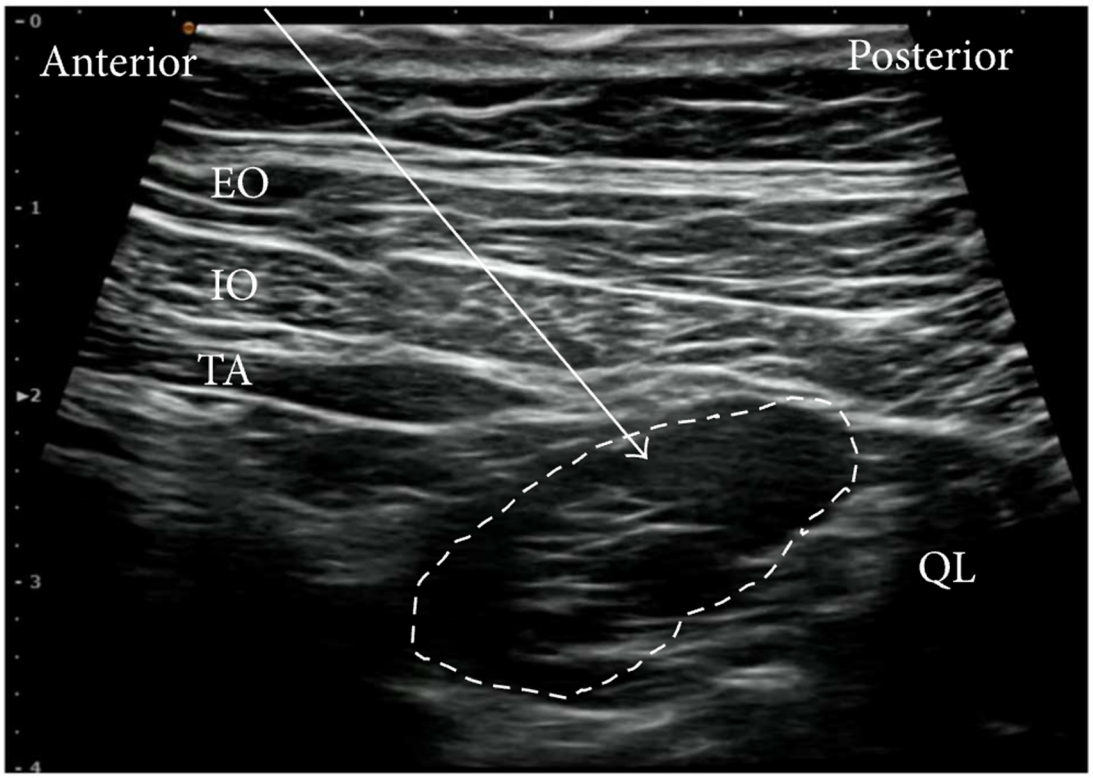
FIG. SHOWING THE DIFFERENT APPROACHES OF QL BLOCK

1.TYPE 1 (LATERAL) QL BLOCK

The patient is placed in supine position .A linear probe is placed in the area of the triangle of Petit until the QL is visualized confirmed. The needle tipis placed at the anterolateral border of the QL at the junction between QL and transversalis fascia, where the local anesthetic is injected. The local anesthetic is deep to the transversus abdominis aponeurosis.


Anterior
Posterior
EO
IO
TA
QL

(a)


Anterior
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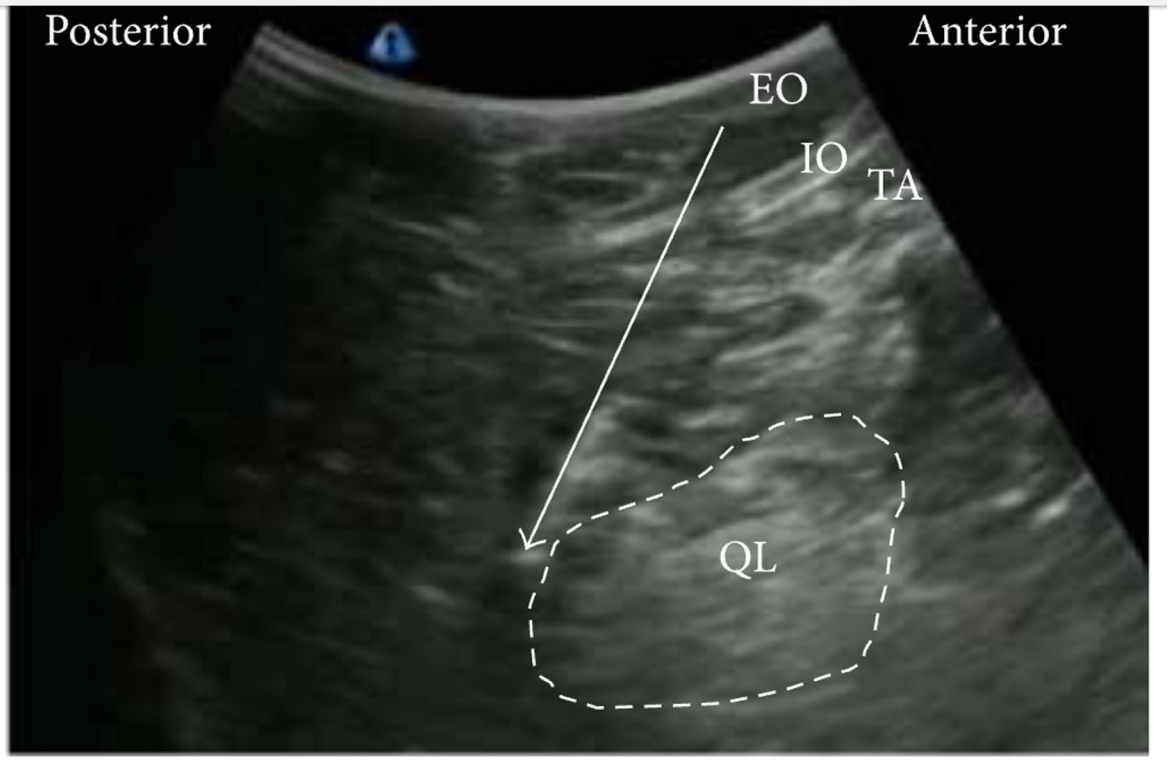
(b)

2.TYPE 2 (POSTERIOR) QL BLOCK

The patient is place in supine position with a pillow placed under the patient for support. This allows for the free movement of the probe. A low frequency probe is place in mid-axillary line and move posteriorly until latissimus dorsi and QL muscles are visible. The needle tip is targeted at posterior aspect of the QL muscle and local anaesthetic is injected.


Posterior
Anterior
EO
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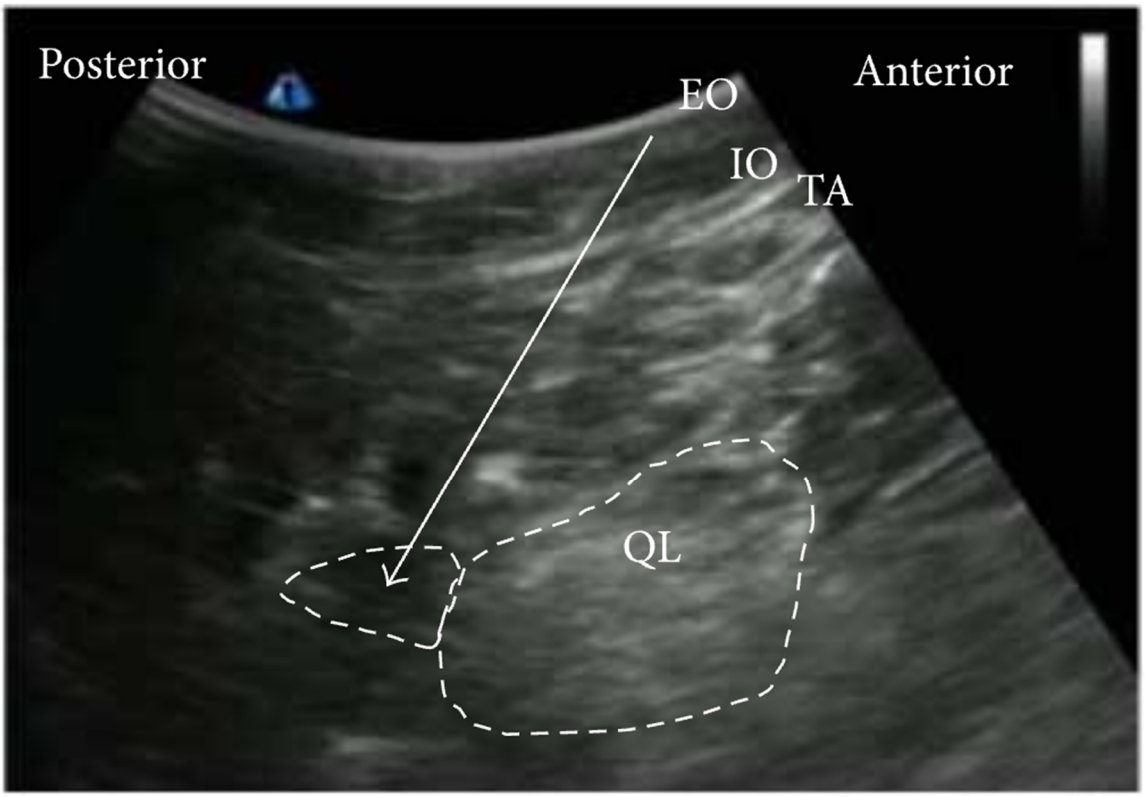
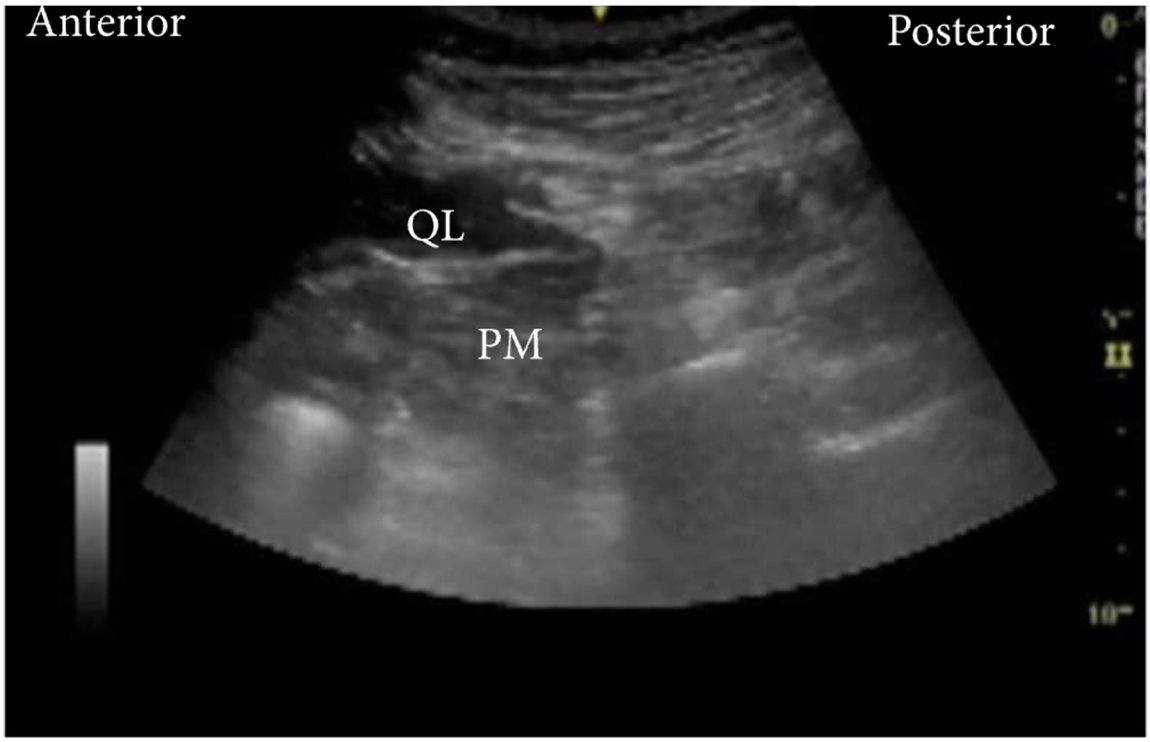

Posterior
Anterior
EO
IO
TA
QL

2. TRANSMUSCULAR (ANTERIOR) QL BLOCK

The patient is placed in the lateral position. A low frequency curved probe is place in the axial plane just above the iliac crest until shamrock sign is visualised. The transverse process of L4 vertebra forms the stem and erector spinae (posterior), quadratus lumborum (lateral) and psoas major (anterior) form the three leaves of the shamrock sign (clover leaf appearance) . The needle is inserted from the posterior end of the transducer through the QL muscle and the tip is targeted between the QL muscle and the psoas major muscle . Local anaesthetic is injected into the fascial plane between the two muscles.



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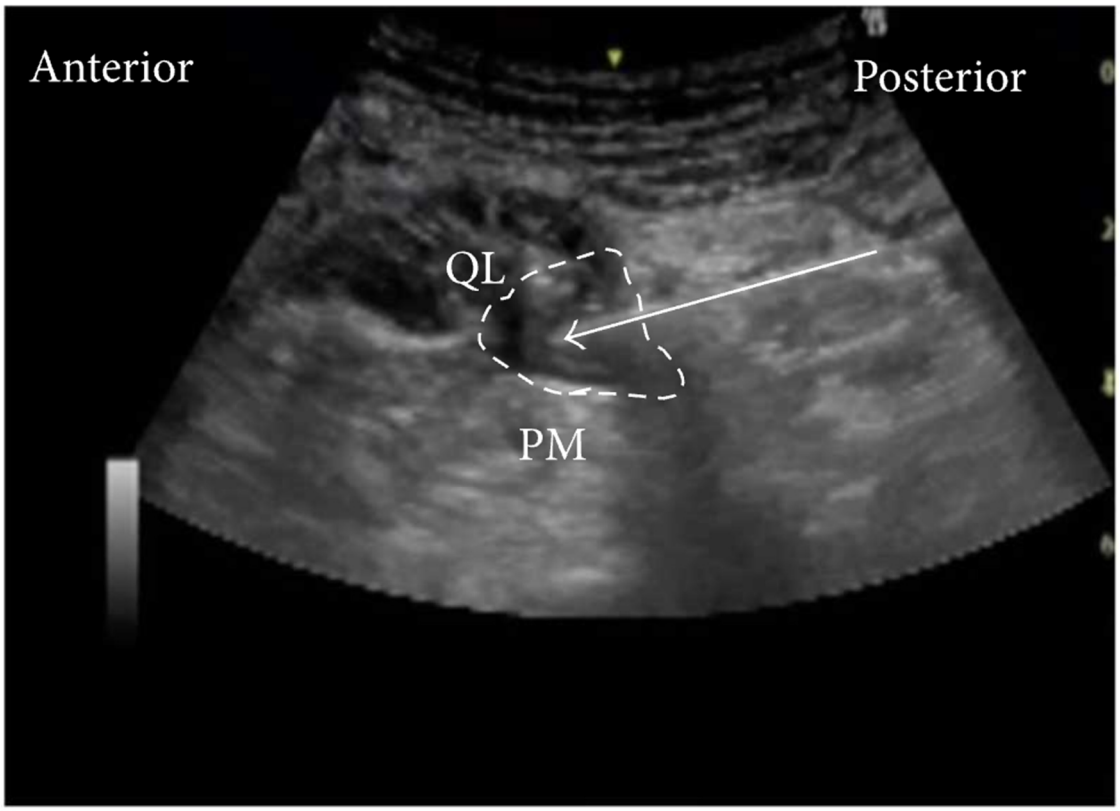


BUPIVACAINE

Bupivacaine is an amino amide class of local anaesthetic drug. It was first synthesized by by Ekenstam in 1957 and its clinical use was started by LJ Telivuo in 1963. Since then it has become one of the widely used local anaesthetic agents clinically.

CHEMISTRY

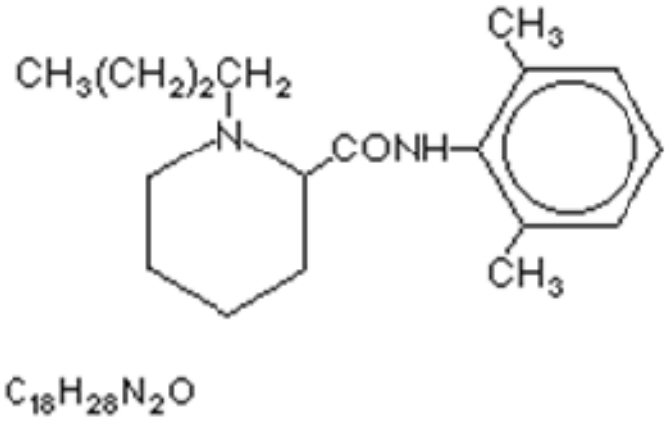


FIG. SHOWING THE STRUCTURE OF BUPIVACAINE

Bupivacaine consists of a tertiary amine attached to a substituted aromatic ring by an amide linkage. The butyl group attached to the piperidine nitrogen makes bupivacaine more lipid soluble and potent. The molecular weight is 288. It is a chiral drug that exists as two enantiomeric forms – dextrorotary (R-) and levorotary (S-) forms. The pure levorotary form Levobupivacaine produce less cardiotoxicity compared to that of the racemic mixture.

PHARMACODYNAMICS

Bupivacaine permeates the nerve's axon membranes and accumulate within the axoplasm. Binding to sites on voltage-gated Na+ channels prevents opening of the channels by inhibiting the conformational changes that underlie channel activation. On comparison with lignocaine, it is four times more potent but the onset of action is slower. The duration of action is considerably longer. The sensory blockade caused by bupivacaine is much more than the motor blockade.

PHARMACOKINETICS

It is a weak base with a pKa of 8.1. Bupivacaine is highly protein bound (95%) . and most important plasma protein binding site is α1 acid glycoprotein. At physiological pH of 7.4, 17% is non-ionised.

The onset and duration of action depend on the dose, concentration, route of administration and vascularity of the site of administration. The volume of distribution is 54 L. The elimination half-life is 210 minutes.

The Clearance is 0.32 L/min

Bupivacaine undergoes biotransformation in liver by aromatic hydroxylation, N-dealkylation, amide hydrolysis, and conjugation. The metabolites are excreted via the kidney. Less than 5% of the drug is excreted unchanged.

DOSAGE & PREPARATIONS

Maximum dose of bupivacaine 2-3 mg/kg. Preparations available include 0.25%, 0.5% solutions in 10 ml and 20 ml vials ,preservative free 0.5% bupivacaine and 0.75% bupivacaine for intrathecal injections.

USES

• Peripheral nerve block (0.25-0.5%)

• Epidural Anaesthesia (0.25-0.5%)

• Spinal Anaesthesia (0.5%, 0.75%)

• Caudal Anaesthesia (0.25-0.5%)

• Infiltration Anaesthesia (0.25-0.5%)

Contraindications

• Paracervical block

• Known hypersensitivity to local anaesthetics

• Intravenous regional anaesthesia (IVRA)

ADVERSE EFFECTS

Local Anaesthesia Systemic Toxicity46 – Plasma concentration greater than 5μg/ml due to overdosage, unintentional intravascular injection and slow metabolic degradation causes systemic toxicity.

Central Nervous System Toxicity

Non-specific signs of toxicity are metallic taste, circumoral numbness, diplopia, tinnitus, dizziness. Excitation is characterized by restlessness,

anxiety, dizziness, tinnitus, blurred vision or tremors. Then, there is a depression of central nervous system causing drowsiness, unconsciousness and cardiac arrest.

Cardiovascular system effects

Part of the cardiac toxicity that occurs with high plasma concentrations of bupivacaine occurs because of the blockade of cardiac sodium channels. Accidental intravenous injection of bupivacaine causes cardiac dysrhythmias, atrioventricular block, ventricular tachycardia and ventricular fibrillation, bradycardia and asystole. Pregnancy increases the sensitivity of cardiotoxic effects of bupivacaine.

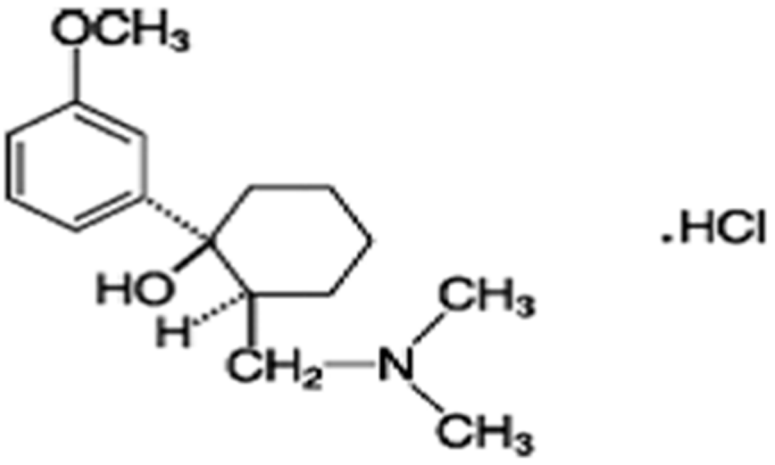
Treatment:

In case of toxicity, call for help. Ventilate the patient with 100% oxygen and give benzodiazepines for seizure suppression. The nearest facility with cardiopulmonary bypass should be alerted. Cardiac arrhythmia should be managed as per Basic Life Support and Advanced Cardiac Life Support with medication adjustment. We should avoid vasopressin, calcium channel blockers, beta-blockers, or local anaesthetic. Rescue must be done with 20% Intra lipid at a dose of 1.5 ml/kg over 1 minute followed by an infusion of 0.25 ml/kg/min.

TRAMADOL

PHARMACOLOGY OF TRAMADOL

Tramadol is a derivative of cyclohexanol. It was developed by a German pharmaceutical company, Grünenthal, in 1962. Chemical structure of tramadol is 2 (dimethyl aminomethyl) 1 (3methoxyphenyl) cyclohexanol hydrochloride.[40 Structural Formula of Tramadol.



Tramadol is a synthetic analgesic used for the treatment of moderate to moderately severe pain. Respiratory depression and abuse potential is considered to be relatively low with tramadol given to its weak opioid activity.

MECHANISM OF ACTION

Tramadol is a weak μ-opioid agonist. Active metabolite of tramadol, O-desmethyl tramadol, is more potent μ-receptor agonist than tramadol. Some other proposed mechanism of tramadol action include serotonin release, NMDA receptor antagonist, norepinephrine reuptake inhibitor, nicotinic and muscarinic acetylcholine receptor antagonist.

Tramadol also act as 5-HT2C receptor antagonist. Release of dopamine and norepinephrine is inhibited by the effect of tramadol on this serotonin receptor.

Tramadol also is a transient receptor potential V1 (TRPV1) receptor agonist.TRPV1 also known as the vanilloid-1 receptor or capsaicin receptor, which helps in the modulation of pain.

PHARMACOKINETICS

It is a racemic mixture, with 1 isomer 4 times as potent than the others at the μ receptor. Volume of distribution of tramadol is 3 L/kg in healthy adults and it is 20% protein bound[46]. Oral bioavailability of tramadol is 70% and after repeated doses this increases to more than 90%. Peak concentration is seen after 2-2.5 hours. Elimination half life of tramadol is 6 hours. It is metabolized by hepatic CYP2D6, CYP3A4 and CYP2B6 and subsequent glucuronidation to a number of metabolites which are excreted in

the urine[47]. One metabolite, M1, is pharmacologically active and its formation is dependent on the 2D6 isoenzyme of CYP450.

DOSING

Recommended dose of tramadol is 50–100 mg every 4–6 hours, to a maximum of 400mg/day. It is advisable to give less dose in elderly patients to a maximum dose of 300mg/day in patients older than 75 years.

In patients with hepatic impairment reduced doses are advised. In patients with cirrhotic liver disease maximum dose of 100mg/day is advisable. Both hepatic impairment and increased age can increase bioavailability of the drug.

Renal Impairment results in decreased excretion of tramadol and its active metabolites. Maximum of 200 mg/day is recommended in patients with creatinine clearance of <30.

DRUG INTERACTIONS

Drugs such as quinidine, fluoxetine, diphenhydramine, paroxetine, amitriptyline and bupropion that inhibit CYP2D6 as well as CYP3A4 inhibitors such as ketoconazole and erythromycin can increase the risk of side effects by reducing the metabolic clearance.

Adverse Effects

Tramadol dependence:

Physical, psychological dependence has been observed with the use of tramadol and on sudden discontinuation withdrawal symptoms are observed specially in chronic users. Anxiety, restlessness, abdominal cramping, diarrhea, autonomic dysfunction and myoclonic activity of the extremities are observed with opioid withdrawal.

Respiratory depression

Respiratory depression with the use of tramadol is less in comparison with other opioids at recommended doses[49]. Higher doses however, can cause respiratory depression in susceptible patients.

Others

Miosis, diaphoresis, blurred vision, tachypnoea, hypokalemia, rash, pruritis, edema, abdominal pain, erythema, facial numbness, movement disorders (tremors, jerking, shivering, shaking), ataxia. Tramadol toxicity is observed with dosages higher than 500mg.

Treatment for Tramadol Overdose

Airway maintenance, oxygenation and supportive treatment is required in case of tramadol toxicity. Opioid antagonist (eg., naloxone 1-4

micrograms/kg) is used for the reversal of effects of tramadol but not all effects are reversed by the use of naloxone. Risk of seizures can also be increased with naloxone administration.

Respiratory depression

Naloxone 2µgm/kg IV may be tried initially, sometimes intubation is required. Naloxone should be avoided in patients with seizures.

Hypotension

Intravenous fluids, vasopressors.

REVIEW OF LITERATURE

1.The study titled Quadratus Lumborum Block Versus Transversus Abdominis Plane Block in Children Undergoing Low Abdominal Surgery: A Randomized Controlled Trial was conducted in which Fifty-three children undergoing unilateral inguinal hernia repair or orchiopexy surgery were randomized into 2 groups: transversus abdominis plane block and quadratus lumborum block. All blocks were performed under general anesthesia before surgery. Pain levels were assessed using an FLACC (Face, Legs, Activity, Cry, Consolability) scale.RESULTS: The study included 50 patients, after excluding 3 patients who were not eligible. The number of patients who required analgesia in the first 24 hours postoperatively was significantly lower in the quadratus lumborum block group ($P < 0.05$). In the quadratus lumborum block group, the postoperative 30-minute and 1-, 2-, 4-, 6-, 12-, and 24-hour FLACC scores were lower compared with those of the transversus abdominis plane block group ($P < 0.05$). Parent satisfaction scores were higher in the quadratus lumborum block group ($P < 0.05$). The results of this study showed that in pediatric patients undergoing unilateral inguinal hernia repair or orchiopexy the quadratus lumborum block provided longer and more effective postoperative analgesia compared with the transversus abdominis plane block.

2.The study titled Efficacy of ultrasound-guided transversus abdominis plane blocks for post-cesarean delivery analgesia: a double-blind, dose-comparisonplacebo-controlled randomized trial was conducted in which Sixty women having cesarean delivery under spinal anesthesia were randomized to receive ultrasound-guided TAP blocks using either high-dose ropivacaine (3mg/kg), low-dose ropivacaine (1.5mg/kg) or placebo. Patients received intrathecal 0.75% bupivacaine 10-12mg, fentanyl 10μg and morphine 150μg and standard multimodal analgesia. The primary outcome was the difference in pain with movement using a numeric rating scale at 24h. Other outcomes included time to first request for analgesia, pain scores at 6, 12, 36, 48h and at 6 and 12weeks, opioid consumption, adverse effects, quality of recovery, and satisfaction.There were no differences between groups in the primary outcome. Mean ± SD pain scores (0-10) with movement at 24h were: high-dose ropivacaine,low-dose ropivacaine and placebo. With respect to secondary outcomes, the mean ± SD pain scores at 6h were lower in the high-dose group compared to the low-dose and placebo groups.Pain scores at 12h were also lower in the high-dose group compared to the low-dose group and placebo group. There was no difference in other outcomes between groups. Neither high- or low-dose TAP blocks as part of a multimodal analgesia regimen including intrathecal morphine improved pain scores with movement at 24h after cesarean delivery when

compared to placebo TAP blocks.High-dose TAP blocks may improve pain scores up to 12h after cesarean delivery.

3. The study titled Ultrasound guided quadratus lumborum block for analgesia after caesarean delivery conducted in 30 women who received a spinal anesthetic for a cesarean delivery and evaluated their post-operative opioid consumption and patient satisfaction. In all the patients, there was no additional opioid consumption during the first 24h after the block. Numeric Rating Scale (NRS) for pain was less than 6 for the first 24h.The patients were all very satisfied with the quality of pain relief .The study concluded that quadratus lumborum block may be a promising anesthetic adjuvant for post-cesarean analgesia. However,further randomized controlled trials are needed to compare the efficacy of the quadratus lumborum block with intrathecal opioids.

4.A study to Evaluation of the effectiveness of the Quadratus Lumborum Block type I using ropivacaine in postoperative analgesia after a cesarean section - a controlled clinical study was done. Sixty patients undergoing caesarean section under spinal anesthesia were randomly and equally assigned to one or other of two groups: QLB I (who received Bilateral Quadratus Lumborum Block type I with the use of 24 mL 0.375% ropivacaine per side) or a Control group. In both groups, on-demand morphine analgesia was administered postoperatively within the first 48

hours.The following were measured: the morphine consumption; the time elapsed from the C-section until the first dose of morphine; and the levels of pain intensity among patients in rest (numeral pain rating scale).There were no statistically significant demographic data differences between the QLB I and Control groups. The following significant differences were observed in the 48-hour postoperative period: morphine consumption was higher in the Control group ($p = 0.000$); the time elapsed from the C-section until the first dose of morphine was longer in QLB I group ($p < 0.05$); and the median of the pain numeric rating scale was higher in the Control group ($p < 0.05$).Itb was concluded that quadratus lumborum block type I significantly reduces morphine consumption and pain levels up to 48 hours postoperatively.

BACKGROUND

Effective postoperative analgesia after lower abdominal surgeries enhances early recovery, ambulation and duration of hospital stay.The effectiveness of transversus abdominis plane for post operative pain relief in abdominal surgeries have been well established.Quadratus lumborum block in recent years have gained much popularity in poatoperative pain management.However,not much studies have been conducted to directly compare and contrast the effecacies of these two blocks. . In the current study,it has been hypothesized that quadratus lumborum block would be equal to or better than the transversus abdominis plane block with regard to pain relief and its duration of action after lower abdominal surgeries.

AIMS & OBJECTIVES

To compare the efficacy of quadratus lumborum vs transverse abdominis plane block for postoperative pain relief after lower abdominal surgeries

MATERIAL AND METHODS

This study was done on patients undergoing mesh repair for bilateral inguinal hernia in the Department of General Surgery, Madurai Medical College, Madurai. The approval of the Institutional Ethical Committee was attained.

Study Design : Prospective, randomized, comparative study.

Sample size : 80 patients

Group 1 - Transversus Abdominis Plane Block,n=40

Group 2 - Quadratus Lumborum Block ,n=40

PRE-ANAESTHETIC EVALUATION

Pre-anaesthetic assessment was done recording a detailed history and performing a complete physical examination. Complete blood count, renal function test, blood grouping/typing, random blood sugar, electrocardiograph and chest x-ray were done. Patients not fulfilling the inclusion and exclusion criteria were excluded from the study. Written informed consent was obtained from all patients.

INCLUSION CRITERIA

1. Age: 18-40 years

2. Male patients undergoing hernioplasty for unilateral inguinal hernia

3.American society of anaesthesiologists status: Grade 1,2,3

EXCLUSION CRITERIA

1. Patient refusal

2. Patients with coagulopathy

3. Patients with local skin infections over abdominal wall

4. Chronic preoperative opioid consumption

5. Allergy or contraindication to use any of the drugs

6. Previous abdominal surgery

7. ASA grade IV and V.

8. Psychiatric illness

METHODOLOGY

Patients were taken in operation theatre after confirming 8 hours preoperative fasting status and brief preoperative review examination. The anaesthetic management of all the patients was standardized.

Standard monitors including NIBP, ECG, Pulse Oxymeter were attached and baseline vitals were recorded. I.V. line was secured with 18G IV canula and 0.9% normal saline started.Spinal anaesthesia was given for all patients using 2ml of 0.5% injection Bupivacaine with 0.5ml (50 mcg) of injection fentanyl.

Under strict aseptic precautions, posterior TAP block and QL block 2(posterior QLB) were performed both in supine position at the end of surgery in their respective groups using 0.125% injection bupivacaine at 0.4ml/kg.A high frequency linear probe was used for the TAP block whereas a low frequency curvilinear probe was used for the quadratus quadratus lumborum block .Detail technique for performing the two blocks have been explained separately earlier.

MATERIALS

The following equipments, drugs and monitors were kept ready for the performance of block at the end of procedure.

EQUIPMENTS

1. 20G Quinke type spinal needle

2. 10 ml syringe

3. 5 ml syringe with 1 ½ “25 gauge needle for skin infiltration

4. 10 cm extension tube

5. Sterile towels and gauze packs

6. Sterile gloves

7. Surgical Spirit Solution

8. Sponge holding forceps

9. Sonosite M turbo USG Machine with high frequency linear array probe and low frequency curvilinear probe

10. Ultrasound Jelly

PARAMETERS MONITERED

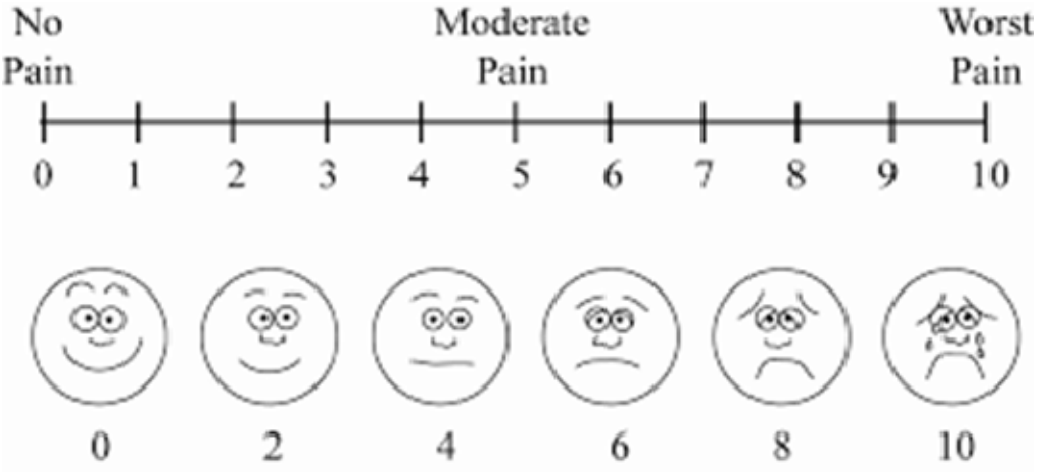
1.Duration of surgery – surgery lasting more than 2 hours were excluded

2.Time of requirement of first analgesia .This also provides the duration of analgesia given by either of the 2 blocks.

In post operative period, Visual Analogue Scale (VAS) was recorded at 0,1,2,4,8,12 and 24 hours of postoperative period. A patient with a score of ≥ 4, out of a total of 10 points (where 0, none; 10, very severe) was administered intramuscular Tramadol at 2mg/kg in both the groups.

3.The total doses of analgesic required in 24 hours was also noted and compared between the two groups.

VISUAL ANALOG SCORE



DATA COLLECTION

In post operative ward, when a patient developed pain of Visual Analogue Scale (VAS) ≥ 4, in a 10 point scale (where 0, none; 10, very severe) intramuscular Tramadol was administered at 1mg/kg in both the groups.

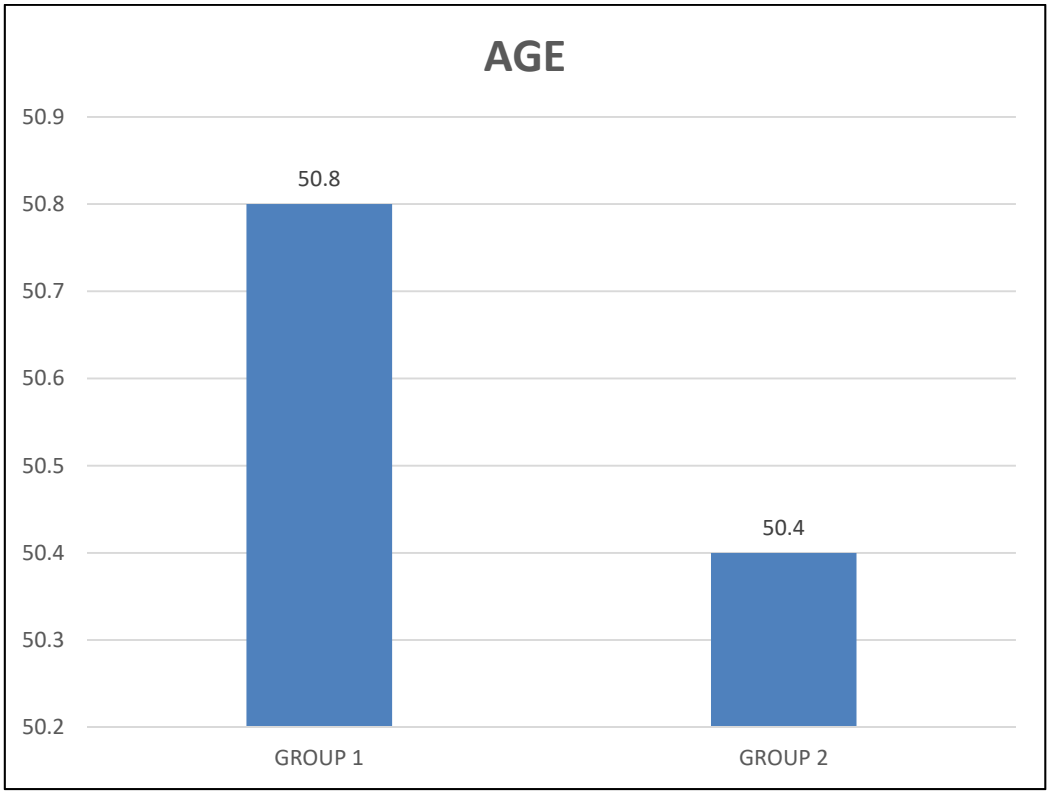
The VAS scores were recorded at 0,1,2,4,6,8,12 and 24 hours.The time of requirement of 1st dose of rescue analgesic was noted and it was taken as the duration of analgesia provided the two blocks.The total doses of analgesic required in 24 hours was also noted and compared between the two groups.

STATISTICAL ANALYSIS AND OBSERVATION

After collecting the data, all the variables are examined for outliers and non-normal distributions. The Categorical variables are expressed as Frequency and Percentage. The Quantity variables are expressed as mean and standard deviation. Descriptive statistics are used to evaluate baseline characteristics.Student's t-test was used to calculate p value.Discrete variables were analyzed uing Chi-Square test and Mann Whitney U test with a $P < 0.05$ considered statistically significant.The statistical analysis was performed using statistical software package SPSS 20.0

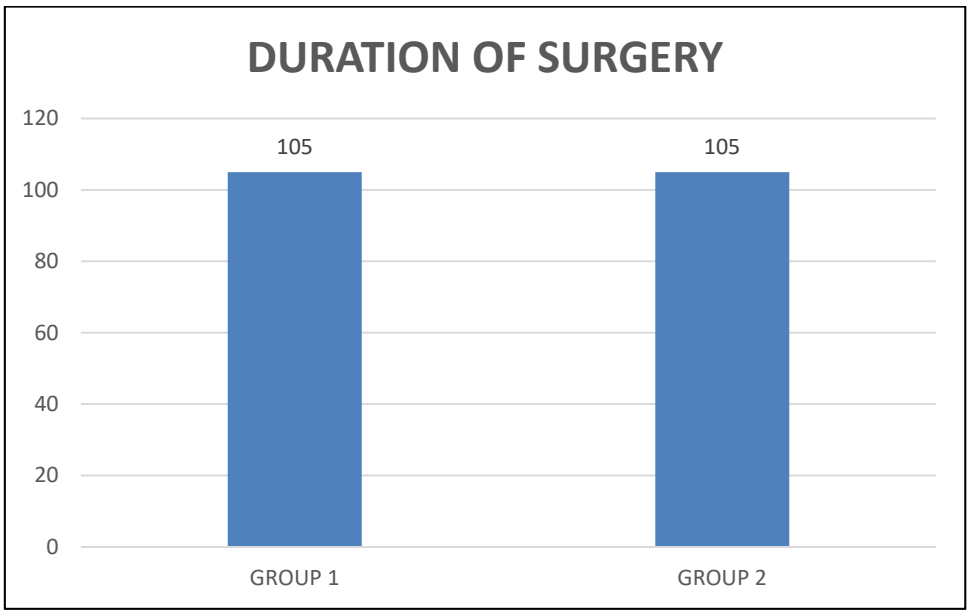
AGE DISTRIBUTION

AGE	GROUP 1	GROUP 2
MEAN	50.8	50.4
SD	4.63	8.89
P VALUE 0.8014		



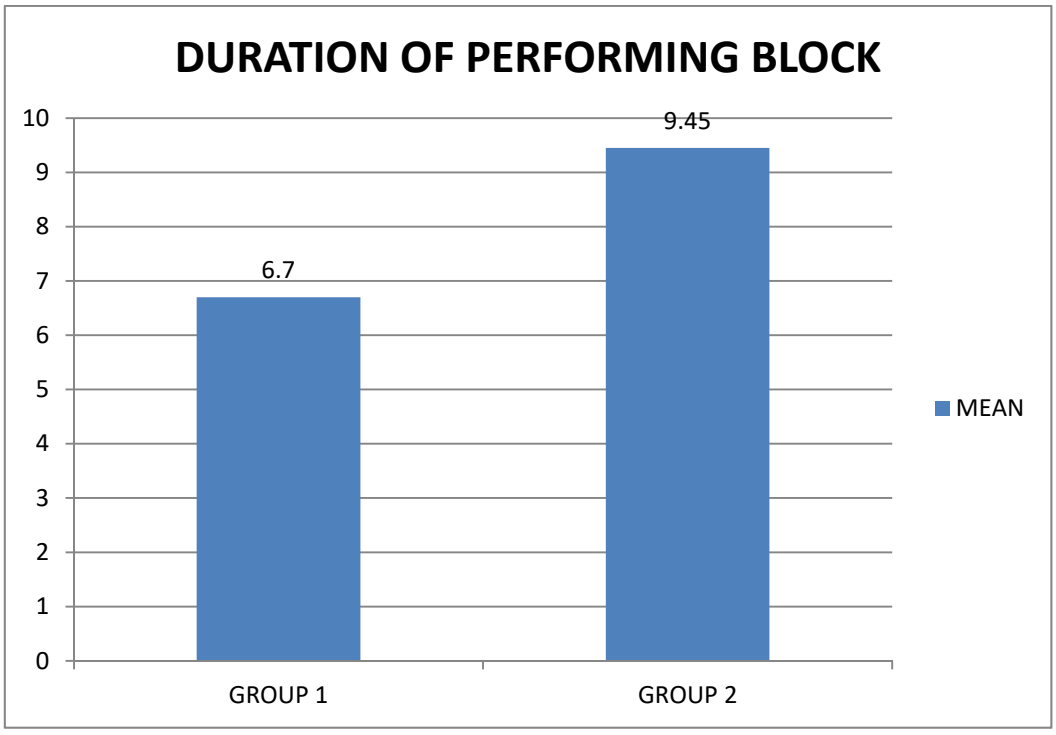
DURATION OF SURGERY

DURATION OF SURGERY (in minutes)	GROUP 1	GROUP 2
MEAN	105	105
SD	8.91	8.04
P VALUE	0.9581	



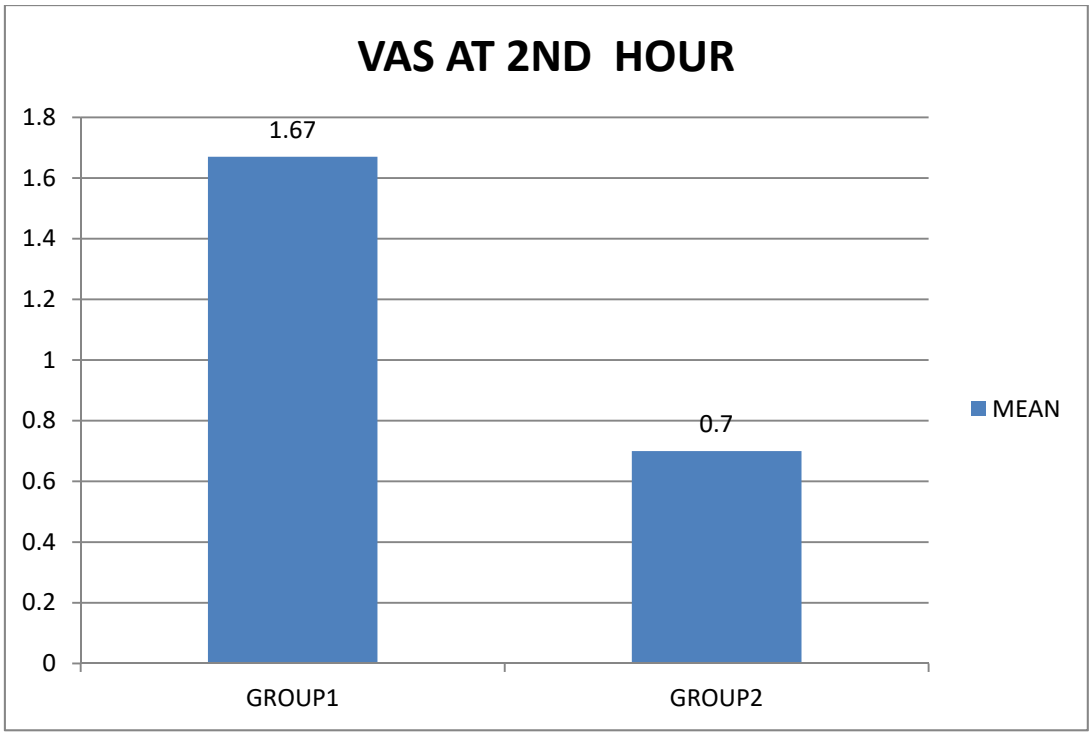
DURATION OF PERFORMING BLOCK

DURATION OF PERFORMING BLOCK (in minutes)	GROUP 1	GROUP 2
MEAN	6.7	9.45
SD	1.32	1.76
P VALUE	0.0001	



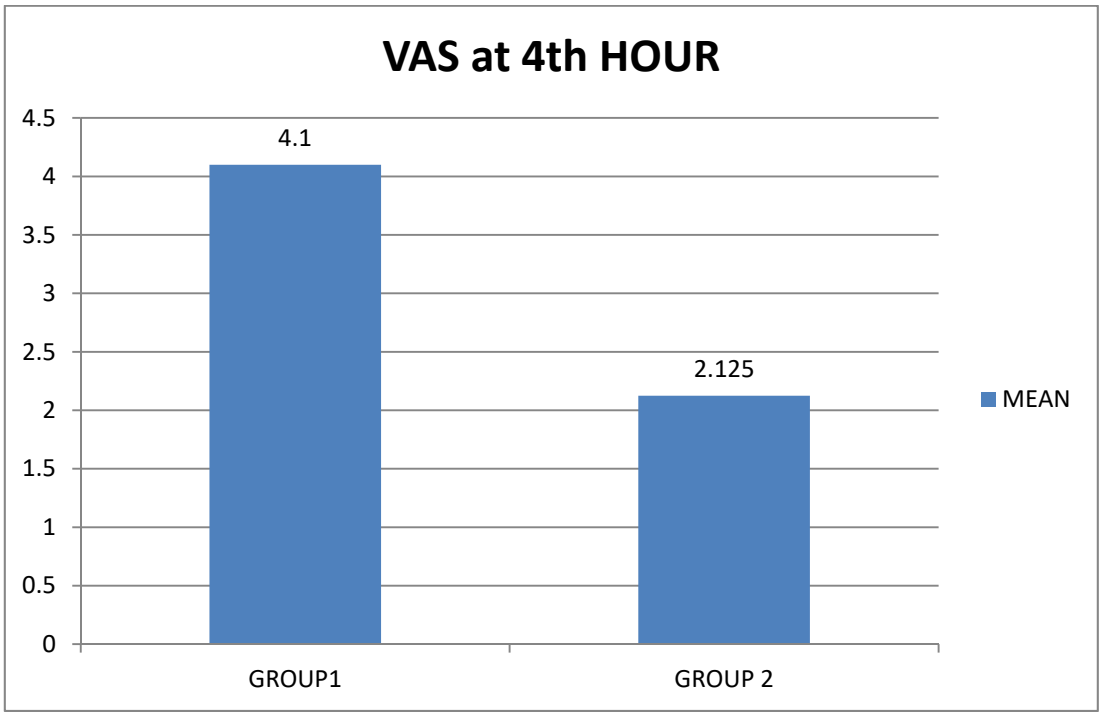
VAS SCORE AT 2ND HOUR

VAS AT 2ND HOUR	GROUP 1	GROUP 2
MEAN	1.67	0.7
SD	0.61	0.64
p value	0.0001	



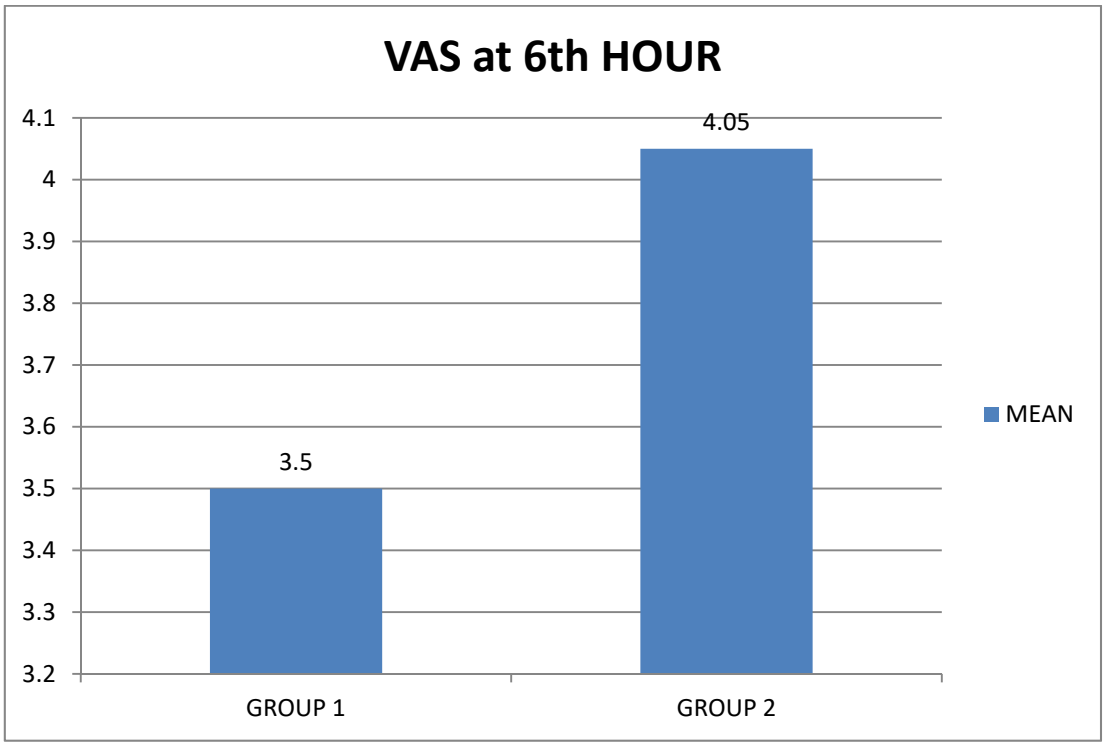
AS SCORE AT 4TH HOUR

VAS at 4th HOUR	GROUP 1	GROUP 2
MEAN	4.1	2.1245
SD	1.03	1.24
p value	0.0001	



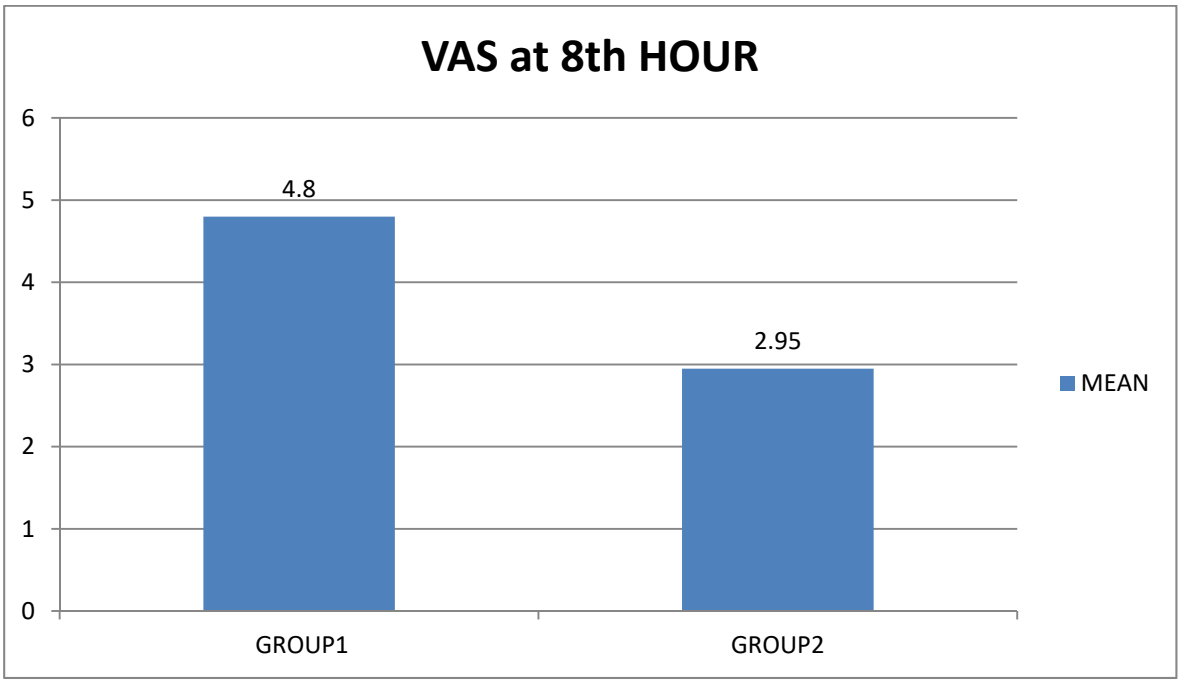
VAS SCORE AT 6TH HOUR

VAS at 6th HOUR	GROUP 1	GROUP 2
MEAN	3.5	4.05
SD	1.3	1.03
p value	0.0458	



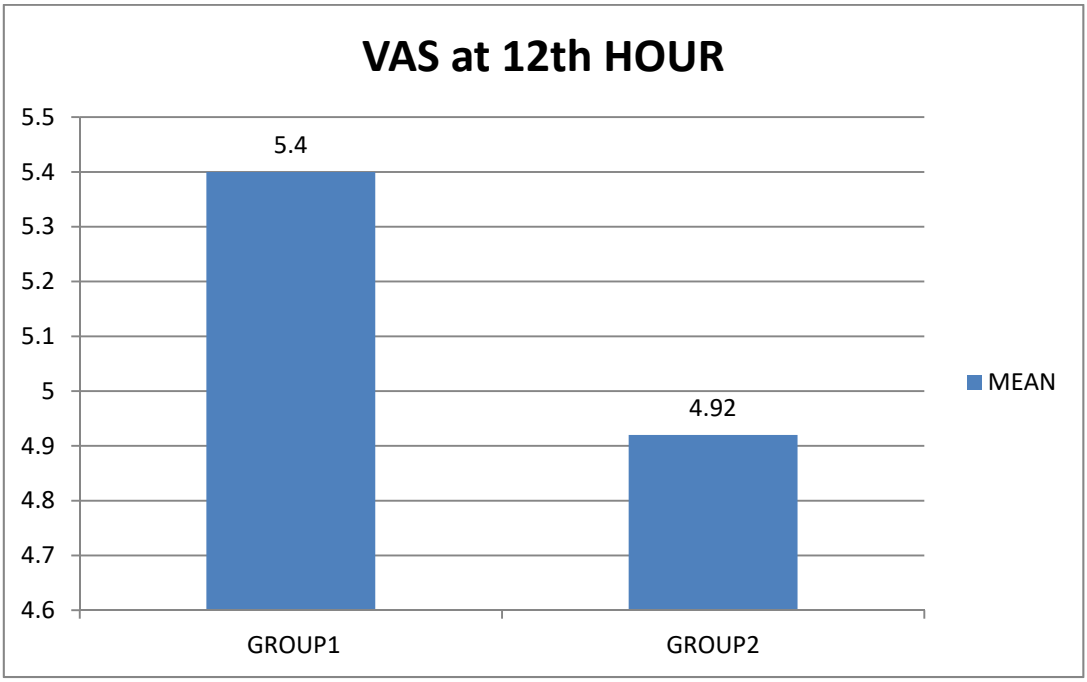
VAS SCORE AT 8TH HOUR

VAS at 8th HOUR	GROUP1	GROUP2
MEAN	4.8	2.95
SD	1.15	1.29
P value	0.0001	



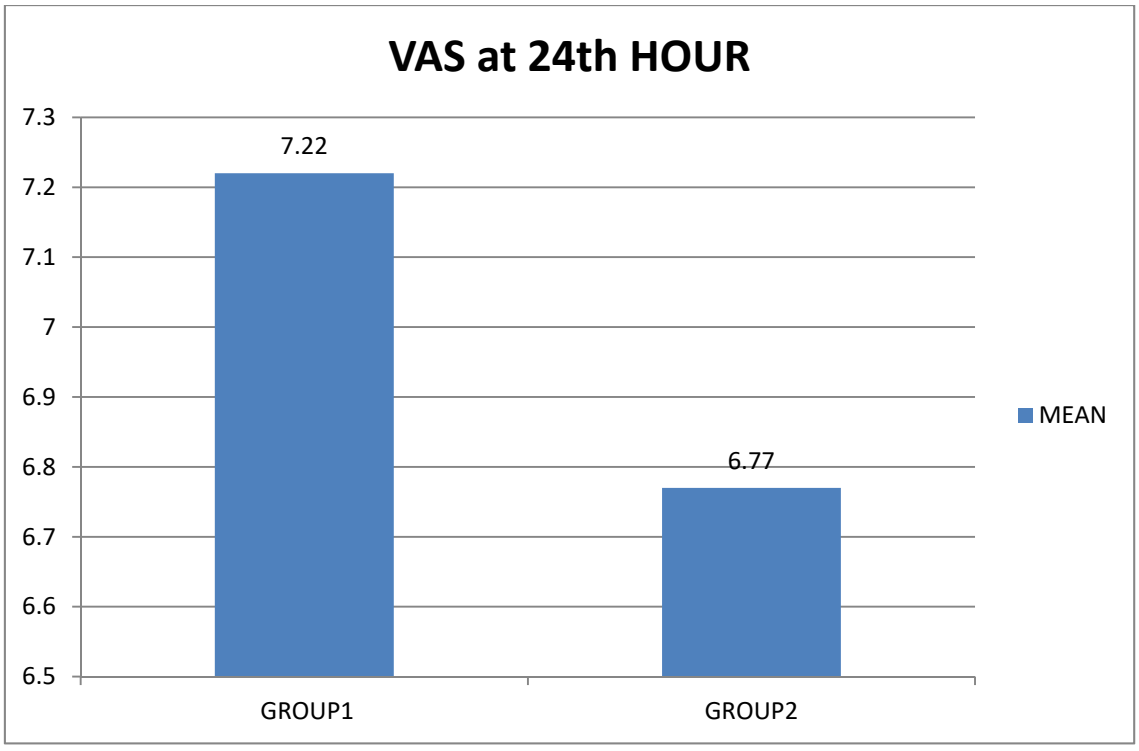
VAS SCORE AT 12TH HOUR

VAS at 12th HOUR	GROUP1	GROUP2
MEAN	5.4	4.92
SD	1.12	0.72
P value	0.0253	



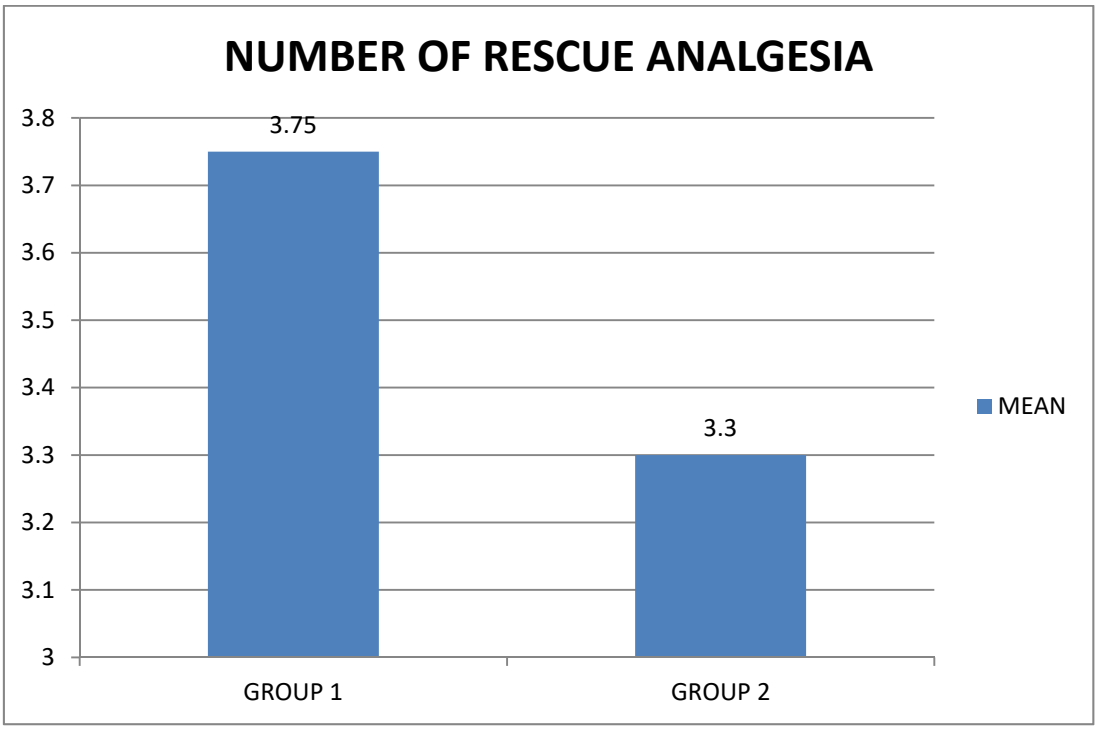
VAS SCORE AT 24TH HOUR

VAS at 24th HOUR	GROUP1	GROUP2
MEAN	7.22	6.77
SD	0.89	0.86
P value	0.0241	



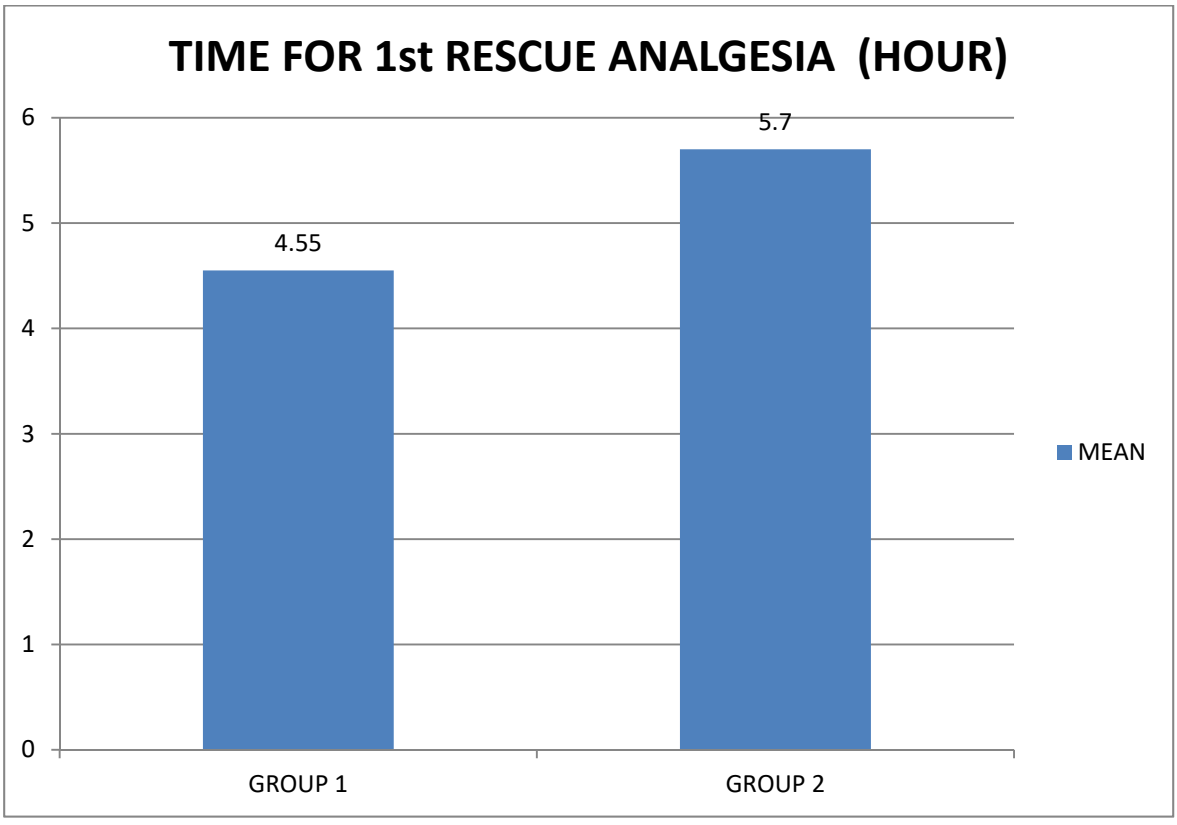
NUMBER OF RESCUE ANALGESIA

NO.OF RESCUE ANALGESIA	GROUP 1	GROUP 2
MEAN	3.75	3.3
SD	0.54	0.46
P value	0.0001	



TIME FOR FIRST RESCUE ANALGESIA

NO.OF RESCUE ANALGESIA	GROUP 1	GROUP 2
MEAN	4.55	5.7
SD	0.904	0.96
P value	0.0001	



RESULT

The sample size for this study was 80 which was divided randomly into 2 groups, namely Group 1(TAP block) and Group 2(QL block).All the blocks performed were successful.Demographic parameters i.e.age and sex (only male patients were included) showed no significant differences in the two groups.The duration of surgery with mean duration for both groups at 105 minutes and p value of 0.9581was statistically insignificant. However, the duration of performing TAP block was significantly less(mean = 6.7mins;p value = 0.0001) as compared to QL block(mean = 9.45). The VAS scores for the 1^{st} and 2^{nd} post operative hour were 0 for both blocks.VAS score at poat operative hours 2,4 and 8 were significant ly less in Group 2. Group 2(mean = 3.75;p value = 0.0001) also showed significantly less number of requirement for rescue analgesia.The time for the first rescue analgesia was also found to be longer in Group 2(mean = 5.7 hours;p value = 0.0001) .Group 1 had a mean duration of 4.55 hours.This This signifies that the duration of analgesia provided by QL block was longer.

DISCUSSION

Ever since it's first description in 2007 by Blanco et al,quadratus lumborum block has steadily gained popularity in being deployed as a technique for post operative pain management.TAP block on the other hand has been relatively more established for the same purpose. However,a direct comparison between the techniques is still rare.Okusz H ,Department of Anaesthesiology,Kocaeli University Hospital,Turkey compared the 2 blocks in children undergoing lower abdominal surgeries with the conclusion that quadratus lumborum block provided longer duration and more effective analgesia than TAP block. Murouchi et al. compared the intramuscular QL block with the lateral TAP block for laparoscopic surgery. Compared to the TAP block, QL block resulted in a widespread and long-lasting analgesia after laparoscopic ovarian surgery . Blanco et al. compared the spinal anesthesia in addition to either the anterior or posterior QL block versus using only spinal anesthesia for caesarean sections.The QL block after caesarean section was effective and provided satisfactory analgesia in combination with a typical postoperative analgesic regimen. They also compared the posterior QL block with the TAP block, where the posterior QL block was found more effective in reducing morphine consumption and demands than TAP block.

Quadratus lumborum block is a fascial plane and does not target a single nerve. Posterior QL block that we used in this study can cover dermatomes from T7 to L1(some studies suggest even upto T4).A study by the New York Society of Regional Anaesthesian suggested that QL block provides analgesia from both somatic as well as visceral pain while the effect of TAP block is limited to somatic pain.Although the spread of local anaesthetic drug in QL block is still a subject of discussion,the thoracolumbar fascia is believed to play an important role. The thoracolumbar fascia consists of 3 layers.The anterior layer is anterior to the quadratus lumborum muscle. The middle layer lies between the erector spinae and the quadratus lumborum muscle muscle. The posterior layer encases the erector spinae . The anterior layer also blends medially with the fascia of the psoas major and laterally with the transversalis fascia. Injection between the anterior layer and quadratus lumborum can spread cranially under the lateral arcuate ligament to the endothoracic fascia and reach the lower thoracic paravertebral space posterior to the endothoracic fascia. A triangular structure called the lumbar interfascial triangle (LIFT) is the target of injection for QL2 block(quadratus lumborum 2). The fascia besides serving as portal for spread of local anaesthetic to the thoracic paravertebral space also contains a dense network of sympathetic fibers as well as mechanoreceptors that majorly contribute to effects of quadratus lumborum block.

CONCLUSION

In summary, the study concludes that the quadratus lumborum block provides longer duration of analgesia ,which is evident by the time for the requirement of first analgesia.The significant reduction in total VAS score(for 24 hours) and number of rescue analgesia for QL block as compared to TAP block also suggest s that QL block afforts better quality of analgesia. Therefore, QL block can be adopted as an alternative technique for management of post operative pain

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PROFORMA

NAME : I.P.NO:

ASA:

AGE & SEX:

WEIGHT :

DATE& TIME OF ADMISSION: DATE& TIME OF

DISCHARGE:

DIAGNOSIS:

PROCEDURE:

HISTORY:

CLINICAL EXAMINATION: PR, BP, SPO2, RS, CVS, P/A,CNS

BASIC INVESTIGATIONS:

a) Complete Blood Count

b) Blood grouping & typing,

c) BT,CT

d) Urine routine

e) Blood urea, RBS, Serum Creatinine, Serum electrolytes

f) CXR-PA view

g) ECG,ECHO

h) USG abdomen

ANAESTHETIC TECHNIQUE

Ultrasound guided quadratus lumborum block 2(Posterior) and ultrasound guided posterior transversus abdominis plane block.

DOSAGE OF DRUG

Both groups received injection bupivacaine 0.125 % at 0.4ml/kg .

Injection tramadol at 1mg/kg IM was given as a rescue analgesic when VAS score was greater than or equal to 4.

PARAMETERS MONITORED

1.Duration of surgery

2.Duration of performing block

3.VAS scores for 0,1,2,4,6,8,12 and 24 hours of postoperative period.

4.Total VAS score for 24 hours

5. Number of rescue analgesia

6.Time for 1st rescue analgesia

PARAMETERS	GROUP 1	GROUP 2
DURATION OF SURGERY		
DURATION OF PERFORMING BLOCK		
NUMBER OF RESCUE ANALGESIA		
TIME FOR 1ST RESCUE ANALGESIA		

VAS SCORE		0hr	1hr	2hr	3hr	4hr	6hr	8hr	12hr	24hr
GROUPS	GROUP 1									
	GROUP 2									

QUESTIONAIRRES USED IN THE STUDY

1) H/O Any Known allergy to Local Anaesthetics/ any drugs
2) H/O Previous Neurological deficit
3) H/O Any Bleeding diathesis
4) Any infection/Local sepsis at block site
5) H/O Any Anti-Psychiatric drugs
6) H/O Any systemic illness-Hypertension Diabetes Mellitus, Bronchial Asthma, Seizuredisorder, Pulmonary Tuberculosis.
7) H/O of smoking ,COPD, Exertional dyspnoea, decreased urine output(Complaints related to CVS,RS,RENAL system)

MASTER CHART

S NO	NAME	AGE	SEX	DURATION OF SURGERY (in hour)	DURATION OF PERFORMANCE OF BLOCK (in minutes)	VAS SCORE								TOTAL VAS SCORE	NUMBER OF RESCUE ANALGESIC	TIME FOR FIRST RESCUE ANALGESIC (in hour)
						0 HR	1HR	2HR	4HR	6HR	8HR	12 HR	24 HR			
1	KAMAL KUMAR	56	M	100	5	0	0	1	3	4	4	6	7	25	4	6
2	VELMURGAN	54	M	115	7	0	0	2	4	2	3	8	8	27	3	4
3	SANTHANAN	53	M	120	8	0	0	2	6	3	6	7	8	32	4	4
4	HARIOM	45	M	90	6	0	0	2	4	3	5	6	7	27	4	4
5	MANAYKANT	52	M	110	4	0	0	2	5	3	5	4	8	27	4	4
6	SHIV KUMAR	49	M	115	8	0	0	1	4	3	4	6	7	25	4	4
7	SASIKANT	50	M	100	9	0	0	1	5	3	5	4	9	27	4	4
8	VASANTH	53	M	120	6	0	0	2	3	5	4	6	7	27	4	6
9	PARAMESWARAN	55	M	115	5	0	0	2	4	2	5	5	8	26	4	4
10	VINEETH KUMAR	54	M	110	7	0	0	2	5	3	4	4	9	27	4	4
11	SANTHOSH	52	M	105	5	0	0	1	5	3	4	6	7	26	4	4
12	GOKUL KRISHNAN	50	M	95	6	0	0	1	3	5	6	5	6	26	3	6
13	YOGESWARAN	45	M	100	7	0	0	2	5	2	6	6	7	28	4	4
14	SELVAMANI	46	M	110	8	0	0	2	4	3	5	4	5	23	4	4
15	JEGU	47	M	105	6	0	0	2	4	2	4	7	8	27	4	4
16	SHIVARATNAM	48	M	90	6	0	0	1	3	6	4	4	6	24	3	6

17	PALPANDI	43	M	105	7	0	0	2	4	3	7	4	6	26	3	4
18	SONAI KUMAR	50	M	110	8	0	0	1	3	4	6	6	7	27	4	6
19	BHOOMINATHAN	54	M	95	4	0	0	3	6	5	5	5	8	32	5	4
20	SHEIK MOHAMMAD	53	M	110	5	0	0	2	4	4	4	5	9	28	5	4
21	MUTHUPANDI	55	M	100	7	0	0	1	3	6	3	6	7	26	3	6
22	MITHLESH	42	M	115	5	0	0	2	4	2	5	4	8	25	3	4
23	MUTHAIYA	45	M	110	6	0	0	2	4	2	6	4	6	24	4	4
24	BOSE	46	M	100	8	0	0	2	3	7	5	4	8	29	3	6
25	KUMARAN	47	M	95	7	0	0	1	6	3	6	5	7	28	4	4
26	ARULMANI	48	M	105	7	0	0	3	5	3	6	6	8	31	3	4
27	VISHNU	49	M	110	8	0	0	2	5	2	6	5	7	27	4	4
28	AKHMAL	50	M	100	9	0	0	1	4	3	5	6	7	26	4	4
29	ANBURAJ	55	M	105	8	0	0	2	2	6	4	7	8	29	4	6
30	DURAIRAJ	56	M	115	6	0	0	1	4	3	6	5	7	26	4	4
31	BHASKARAN	57	M	120	7	0	0	2	3	5	3	4	7	24	3	6
32	MALAI	56	M	105	5	0	0	3	4	4	6	5	7	29	4	4
33	KARTHICK	58	M	100	8	0	0	1	2	4	3	6	7	23	3	6
34	VELMURGAN	59	M	95	6	0	0	2	6	2	6	7	7	30	4	4
35	RAJAGOPAL	54	M	90	7	0	0	2	5	4	3	7	7	28	4	4
36	NAVEEN	56	M	100	8	0	0	1	5	2	3	5	6	22	3	4
37	CHALLAN	55	M	90	7	0	0	2	4	2	5	4	6	23	4	4
38	VANKATESH	46	M	120	9	0	0	2	4	3	6	5	7	27	4	4
39	RAGUL	45	M	100	7	0	0	3	3	6	3	6	7	28	3	6
40	THANDAPANI	44	M	105	6	0	0	2	4	3	6	7	8	30	4	4

SL NO.	NAME	AGE	SEX	DURATION OF SURGERY	DURATION OF PERFORMING BLOCK	TOTAL VAS SCORE								TOTAL VAS SCORE	NO OF RESCUE ANALGESIA	TIME FOR FIRST ANALGESIC
						0 HR	1HR	2HR	4HR	6HR	8HR	12HR	24			
1	SELVARAJ	54	M	110	10	0	0	1	2	4	4	5	7	23	3	6
2	ANNAMALAI	46	M	100	9	0	0	1	2	4	2	4	6	19	3	6
3	SELVAM	55	M	90	7	0	0	0	1	5	4	7	7	24	4	6
4	AJITH KUMAR	56	M	100	10	0	0	2	4	2	4	5	8	25	4	4
5	RAJA	54	M	100	6	0	0	1	2	5	2	4	7	21	3	6
6	MALAISAMY	56	M	120	8	0	0	2	4	3	2	5	7	23	3	4
7	MURUGAN	53	M	105	9	0	0	0	1	6	3	6	6	22	3	6
8	PRAKASH	46	M	110	9	0	0	0	5	3	4	4	8	24	4	4
9	KRISHNAN	45	M	115	10	0	0	0	1	3	5	5	6	20	3	8
10	SUNDAR	48	M	90	12	0	0	1	2	4	3	4	5	19	3	6
11	PERIYAKARUPPU	49	M	110	9	0	0	2	4	4	3	5	7	25	4	4
12	BALAJI	43	M	115	13	0	0	0	1	5	2	5	6	19	3	6
13	SARAVANAN	50	M	105	10	0	0	0	2	4	4	6	7	23	4	6
14	RAJENDRAN	54	M	100	11	0	0	1	2	5	3	4	6	21	3	6
15	KANNAN	56	M	95	9	0	0	1	2	4	3	5	7	22	3	6
16	SOORAPANDI	57	M	100	8	0	0	0	2	5	4	5	6	22	4	6
17	GOVINDARAJ	58	M	105	12	0	0	2	5	3	4	5	7	26	4	4
18	SARAVANA KUMAR	54	M	110	10	0	0	0	1	4	2	5	6	18	3	6
19	POTHIRAJ	59	M	115	6	0	0	1	2	4	3	6	9	25	3	6
20	SENTHIL KUMAR	55	M	100	14	0	0	0	1	4	2	5	7	19	3	6
21	GANESAN	55	M	105	10	0	0	0	1	3	7	5	7	23	3	8
22	KANDHAN	45	M	110	8	0	0	0	1	5	2	6	7	21	3	6

23	RAMASAMY	43	M	120	9	0	0	1	1	4	2	5	6	19	3	6
24	THIRUMURGAN	45	M	105	13	0	0	0	1	5	2	5	7	20	3	6
25	BALAMURGAN	43	M	95	9	0	0	1	4	2	5	4	8	24	4	4
26	SUBRAMANI	45	M	100	11	0	0	1	2	6	4	5	7	25	4	6
27	JEYARAMAN	46	M	110	8	0	0	0	1	5	2	5	6	19	3	6
28	MANIKANDAN	47	M	115	10	0	0	0	1	4	4	5	8	22	4	6
29	SAKTHIVEL	56	M	110	10	0	0	1	5	2	5	4	7	24	4	4
30	MANISH	54	M	100	11	0	0	0	1	4	2	4	6	17	3	6
31	PERIYAKARUPPU	5	M	100	9	0	0	1	2	4	2	5	5	19	3	6
32	RAMAKRISHNAN	54	M	120	8	0	0	1	2	4	1	4	6	18	3	6
33	PANDI	45	M	95	9	0	0	1	2	4	2	5	7	21	3	6
34	MUTHUKUMAR	56	M	100	10	0	0	1	2	4	1	4	6	18	3	6
35	MARIAPPAN	54	M	115	7	0	0	1	4	2	4	6	8	25	4	4
36	PALANIVEL	54	M	95	9	0	0	1	2	4	1	5	7	20	3	6
37	CHELLADURAI	56	M	100	10	0	0	1	2	4	2	6	8	23	3	6
38	CHINNASAMY	57	M	110	9	0	0	0	1	4	2	5	7	19	3	6
39	UDAYA SOORAYAN	57	M	105	8	0	0	1	2	6	3	4	6	22	3	6
40	MADASAMY	54	M	100	8	0	0	1	2	5	2	5	7	22	3	6

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ETHICS COMMITTEE CERTIFICATE

Name of the Candidate	:	Dr.Thangjangul Khongsai
Course	:	PG in MD., Anaesthesia
Period of Study	:	2016-2019
College	:	MADURAI MEDICAL COLLEGE
Research Topic	:	A study to compare the efficacy of quadrates lumborum vs transverse abdominis plane block postoperative pain relief after lower abdominal surgeries
Ethical Committee as on	:	10.07.2018

The Ethics Committee, Madurai Medical College has decided to inform that your Research proposal is accepted.

Member Secretary Chairman Dean / Convenor

Prof Dr V Nagaraajan
M.D., MNAMS, D.M., Dsc.,(Neuro), Dsc (Hon)
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Madurai

17 JUL 2018

PLAGARISM CERTIFICATE

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